

**SUBURBAN ACTIVITY CENTERS
Private Sector Participation**

March 1989

**U.S. DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION**

prepared by

**Joint Center for Urban Mobility Research
RICE CENTER**

Suburban Activity Centers

Private Sector Participation in the Financing and Management of Transportation Programs

Final Report

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The Joint Center for Urban Mobility Research
a research program of Rice Center
Houston, Texas

Prepared for
Urban Mass Transportation Administration

March 1989

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EXECUTIVE SUMMARY

Suburban mobility is one of the most critical transportation problems facing American cities today. The purpose of this research project is to develop an understanding of the suburban activity center (SAC) mobility problems and the ways that public and private entities are addressing these problems. The project has two objectives:

1. Develop a data base on suburban activity centers and CBDs which documents characteristics of the centers, their mobility needs, transportation actions, and identifies the local private and public organizational and financing arrangements used to implement these actions.
2. Develop the basis for identifying potential roles that the Urban Mass Transportation Administration, state and local governments, transit agencies and the private sector can assume in the financing, management, and the negotiation of agreements to solve mobility needs of suburban activity centers.

This was accomplished using several methods. It included a systematic review of the literature and practice, empirical research of a large number of cases to explore broad relationships, and field studies of selected cases for more in-depth analysis.

Survey Research

A survey of activity centers was designed to measure six general categories of variables:

- types of suburban activity centers,
- travel characteristics,
- mobility problems,
- transportation actions,
- institutional organization, and
- financing techniques.

Information on the first two variables was obtained through data gathered in an earlier UMTA-funded study (Cervero, 1988). Rice Center completed part of the missing information, verified the available data, expanded the number of observations, and supplemented the data base with additional information. This information was obtained through telephone interviews and by mail with individuals in the major employment centers and metropolitan officials during the spring of 1988.

Responses from 85 centers (64 SACs and 21 CBDs) with reasonably complete data on 61 variables were obtained and analyzed in 23 metropolitan areas.

Case Study Research

Four case study sites were selected according to criteria such as: the existence of traffic congestion, innovative public/private partnerships, and representation of different types of centers.

- The Warner Center in Los Angeles, classified as a megacenter, is heavily engaged in ridesharing, and has an active employer association. The City expects to develop a trip-reduction ordinance and implement an impact fee program in the center.
- The Hacienda Business Park in Pleasanton, California is a planned office park development. A Transportation Systems Management program was created and contributions to roadway improvements were made through the establishment of an assessment district.
- The Baltimore/Washington Airport Corridor is a large mixed-use development. Two major efforts have been made to alleviate congestion in the corridor: construction of highway improvements and formation of a Commuter Transportation Center.
- The North Dallas Parkway Center is the largest and most congested megacenter in the Dallas area. The cities of Dallas, Addison, and Farmers Branch are coordinating development and transportation responses to address mobility problems. Urban design improvements and the establishment of a TMA are among the recommendations adopted for the center.

Findings

The survey research has concluded that there are four distinct categories of centers: Office concentrations, mixed use developments, megacenters, and large corridors.

Land use design and transportation characteristics. Variations in travel behavior can be explained by the differences in land use mix, density and design, as well as type of transportation facilities available at the centers. Suburban activity centers tend to have lower densities than do CBDs. Buildings and service functions within centers are usually located far from each other thus creating the need to use auto for short internal trips. The survey results indicate that transit and internal circulation is commonly found in higher density settings such as CBDs and megacenters. The reverse relationship applies to parking availability. Most suburban commuters have access to autos and employment centers have ample free parking that further encourages auto commuting.

Work trips to CBDs involve longer commutes than those to SACs, while distances are similar. Travel needs are dispersed making traditional transit service too expensive to operate. Most frequent problems mentioned in the survey are those involving intra-center congestion due to traffic passing through. According to both the case study findings as well as the survey results, traffic congestion is usually not perceived as a major problem yet. It is the fear of anticipated future congestion that most often stimulates local action. Responses from large corridors and CBDs indicate concern about existing congestion. The

public sector, in general, tends to be more concerned about congestion in most of the centers.

Public/Private Partnerships. The private sector has taken considerable leadership in seeking solutions to suburban mobility problems. Employers associations and TMAs can be very effective in influencing commuter behavior. Both the case studies and the survey results indicate that private or public solutions cannot develop in isolation. They can only be successful if there is cooperation and support between the two sectors.

Organizational solutions. The case studies demonstrate that there is no single organizational formula that is appropriate for all areas. The most desirable form depends on local conditions, pressures and opportunities. Among the areas that have congestion problems, 70 percent of the megacenters and 40 percent of CBDs have a TMA, 83 percent of both types of centers have an employers' association. The Pleasanton trip reduction ordinance is a successful example of a city/developer cooperation. Finally, the establishment of the Parkway Center TMA required close collaboration between private and public officials in three neighboring jurisdictions.

Financing. Results from the survey research and all the case studies have shown a high degree of participation by developers and major employers in contributing funds for planning studies, highway improvements and shuttle services. Strong business leadership was observed in both California cases.

Transportation solutions. Several transit agencies are instituting innovative programs to address suburban mobility needs, such as encouraging transportation demand management actions, expansion of express commuter bus service and reverse commuter service, and expansion or establishment of new rail services.

The quantitative analysis found strong relationship between the existence of TMAs and transportation programs such as employer transit subsidies, trip reduction ordinances, and area circulation improvements. Roadway improvements are strongly related to employers associations. The private sector is less interested in alternatives to major roadways than the public sector. In CBDs, transit improvements, auto use reductions, i.e parking restrictions, and increased parking fees are more common. Contracting out for transit services is favored more highly by SACs than CBDs.

State and local government roles. One important finding, especially from the case studies, is that state and local policies play an important role in shaping mobility problems and on how individual SAC's try to solve them. State government leadership was more obvious in Baltimore and city leadership in the Dallas case.

The separation of policy from operations in Los Angeles and the availability of multiple public and private operators in the Bay area has been claimed to have improved transit efficiency. The Metropolitan Transportation Commission in the San Francisco region, and the County in the Los Angeles area play important roles through their authority to allocate funds.

Recommendations

The suburban mobility problem is complex; it involves transportation, urban development, economic development, political, and environmental issues. For solutions to be effective, coordinated action by public and private concerns is needed at all levels of government and across functional lines. Solutions need to combine increased transportation supply and demand management actions.

Suburban activity centers, for the most part, are located beyond the central city boundaries, often they are in unincorporated areas or they span over multiple jurisdictions. There is a need for a centralized policy setting mechanism that assures coordination of actions towards a common regional plan. Federal, state, and local officials as well as the private sector need to become involved in making transportation decisions in suburban centers.

Federal and State policy. Federal policies should aim to coordinate policies across functional departments and reduce barriers that impede the implementation of innovative actions at the local level. Federal initiatives should promote consideration of a full range of local options available in financing, operation, and maintenance of transportation facilities and services.

States appear to be the appropriate entities to provide the needed leadership and stimulate change. The reasons for this include the key role states play in planning, funding, constructing and maintaining the highway system. Moreover, states are removed enough from the local scene to be impartial and, at the same time, sensitive to broader regional issues. In cooperation with local governments, they should strengthen regional institutions, broaden the mission of state transportation departments to give transit equal priority to that enjoyed by highways, coordinate transportation plans with other urban development policies, and provide guidelines for regional planning.

Regional agencies. MPOs are the logical entities to coordinate public and private initiatives as part of the development of the regional transportation plan and transportation improvement program. In addition, consideration is needed to coordinate transportation efforts with regional land use and fiscal policies.

Local governments. It is recommended that local governments consider alternative solutions that go beyond expansion of roadway capacity to include transportation demand management approaches, urban design changes and encouragement of the development of a physical environment in which transit can function effectively, and facilitation of the formation of new organizational structures (i.e. TMAs).

Private sector roles. Major employers, developers and property owners should promote their interests by contributing to construction and financing of transportation improvements in their area. TMAs have demonstrated the ability to be effective in project planning and implementation, as well as lobbying for local and regional issues. The research findings have identified promising opportunities for private transportation providers and brokers within suburban areas and at the regional level.

Research needs. There is no public system in place which maintains a comprehensive

inventory of office, retail and employment data, especially for suburban employment centers. Cities and MPOs are not well equipped with information on suburban centers which often cross census tracts and municipal boundaries. Real estate or developer organizations are much more responsive and knowledgeable of suburban conditions.

There is a need for a complete and periodically updated inventory of centers and a national transportation management organization directory. It is important to improve enforcement and monitoring of TDM ordinances, and other innovative solutions. Collection and dissemination of information on best practices around the country should continue through workshops, seminars, guidebooks and research briefs. Finally, there is a need for action oriented research which focuses on suburban center mobility issues, identifies problems in early stages of development, and experiments with innovative corrective actions.

CHAPTER 1. INTRODUCTION

Background

Suburban mobility appears to be the most important transportation problem facing American cities today. In recent years there has been a significant shift in employment location within metropolitan areas. It primarily involves migration of office and high-tech jobs to suburban areas. In 1970, 75 percent of all office space in the U.S. was located in central cities and 25 percent in the suburbs. By 1986, the situation had been reversed: 58 percent of total office space was in the suburbs and 42 percent was in the core cities. Rising cost of downtown office space, the need for more space, proximity to trained, and white-collar labor force are some of the factors that have contributed to the shift of jobs to the suburbs (Orski 1986). A great portion of the employment growth outside of downtowns has concentrated in suburban activity centers (SACs). For example, a Rice Center study of Houston (1987) has found that the combined employment of three major centers equals the employment of the CBD and provides 30 percent of the non-CBD jobs in a core area, where about half of the county jobs are located.

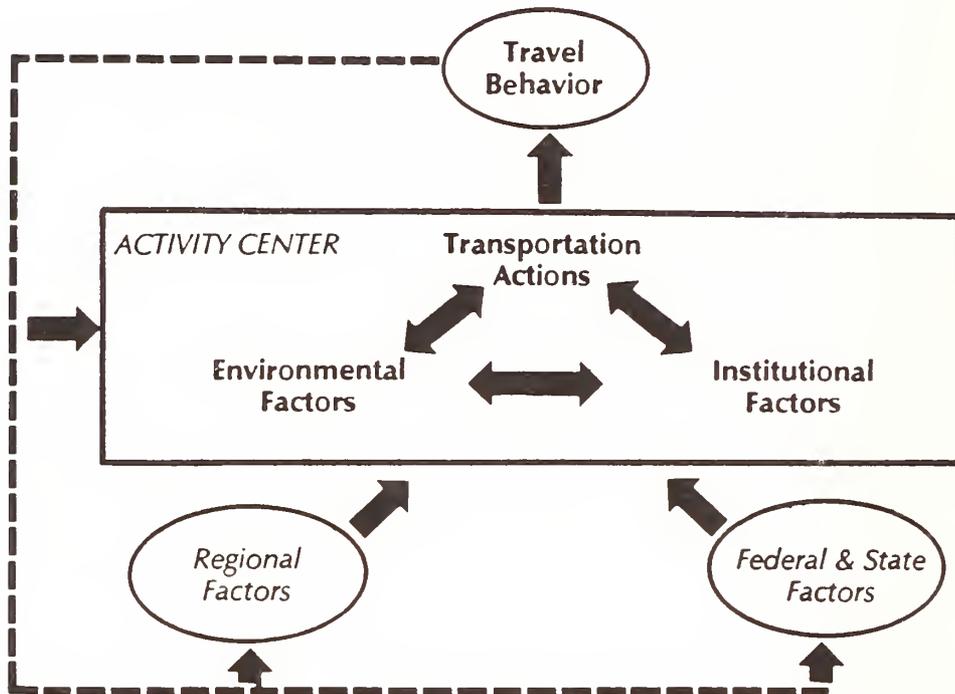
Problem Definition

Research has shown that the two major mobility issues facing suburban activity centers are: (a) transportation to, from, and between centers, and (b) transportation within the center itself. The physical layout and land use composition of suburban activity centers, availability of ample free parking in many centers reinforces the auto dependency by employees and residents (Cervero 1986). As suburban developments expand and density increases, the original highway and arterial system is used to capacity. Given today's fiscal constraints, there are few prospects for major roadway expansion. Most new highway funds are allocated primarily for rehabilitation and maintenance. Traditional mass transit systems were never designed to serve a dispersed distribution of activity, and therefore provide for only a very small portion of suburban mobility needs.

There are a number of factors that are considered to be important in understanding suburban travel behavior and the way transportation solutions are formulated and implemented. They include: environmental (socio economic and design) characteristics, organizational structures, and availability of financing. Figure 1-1 shows how these three variables interact at the center level to influence transportation facilities and services and how regional, state, and federal factors may affect local actions.

One problem facing transportation planners and researchers in the study of suburban mobility is the lack of data on environmental and institutional factors, transportation actions, and travel behavior in and around activity centers. Such data are more readily available for central business districts. It is expected that such information would assist both the public and the private sector at suburban activity centers in making rational and cooperative decisions on the most appropriate strategies in the financing and management of transit related facilities and services.

Figure 1-1. Variables Influencing Travel Behavior



Study Objectives

The purposes of this research project are to:

1. Develop a data base on suburban activity centers documenting characteristics of centers, their mobility needs, the practice of transportation actions, and the local private and public organizational and financing arrangements used to implement these actions.
2. Develop the basis for identifying potential roles that the Urban Mass Transportation Administration (UMTA), state and local governments, transit agencies and the private sector can assume in financing, managing, and negotiating agreements to solve the mobility needs of suburban activity centers.

This is accomplished through a multi-method approach. It includes a systematic review of the literature and practice, empirical research of a large number of cases to explore broad relationships, and field studies of selected cases for more in-depth analysis.

Report Outline

The report is organized into four chapters in addition to the introduction (chapter one). The second chapter reviews the literature and practice in the following areas: Characteristics of suburban activity centers; travel needs and demands; nature of the congestion problem; management and organizational approaches; transportation improvement strategies; and financing approaches.

The third chapter describes the methods and results from a survey of 85 activity centers that includes both suburban centers and downtowns in 23 metropolitan areas.

The fourth chapter is devoted to describing findings from five detailed case studies. These include suburban activity centers in Los Angeles, San Francisco, Baltimore, Dallas, and Houston.

The last chapter presents the summary findings and conclusions from the quantitative analysis and the case studies. It also provides policy recommendations on procedures that UMTA, state and local governments, transit agencies, and the private sector can follow in implementing public/private actions for the solution of suburban activity center mobility problems.

CHAPTER 2. REVIEW OF THE LITERATURE AND PRACTICE

Growing concern about problems with suburban mobility is reflected in the increasing amount of transportation research on suburban congestion and the growth of suburban activity centers. Traditionally, city and county governments focused their mobility improvement efforts on the regional CBD. The transportation infrastructure which now serves downtown commuters was often developed over many decades. However, the boom in suburban employment, which has occurred largely since the 1970s, has created demands which the public transit provider has been unable to meet. From 1980 to 1983, about two-thirds of the office growth in the nation's largest metropolitan areas was in the suburbs (Dowall 1986). Williams has reported that suburban centers were growing two to four times faster than CBDs in terms of employment and office space (TRB 1986).

In response to suburban mobility needs, the private sector has increasingly supplied needed infrastructure itself, and/or entered into joint ventures with the public sector. This chapter will review the literature and practice in six areas: (1) factors in the definition and classification of suburban activity centers and the typology of centers; (2) travel needs and transit demand; (3) the nature of the traffic congestion problem; (4) management/organizational approaches--including transportation management associations (TMA's) and other organizational structures; (5) transportation improvement strategies--such as ridesharing, parking reduction policies, trip reduction ordinances, and privately financed and/or privately constructed mass transit; and finally, (6) financing approaches--assessment districts, ordinances and impact fees.

DEFINITION AND CLASSIFICATION OF SUBURBAN ACTIVITY CENTERS

Factors in the Definition and Classification of Suburban Activity Centers

What this report calls "suburban activity centers" (SACs) has many names in the literature on this topic, including urban villages, megacenters, outer cities, major diversified centers, suburban downtowns, metrotowns, regional centers, suburban employment centers, and clusters of activity. In broad terms, an "activity center" is any development in a defined area which is a major generator of, or destination for, large numbers of people--such as a business park, housing development, amusement park, or industrial complex. In this report, "activity center" will be used to refer to office employee work destinations, which may have significant industrial, retail, and hotel components as well. Although many of these activity centers exist well within the city limits, the term "suburban" is used to differentiate these centers from the regional central business district.

A Rice Center activity center study (January 1987) defined activity centers as "major" if they met or exceeded the following criteria:

- Building size: Over 1 million square feet.
- Land area: Between .5 and 3 square miles.
- Population: Over 50,000 total workers, visitors, and residents daily.

- Density: Over 50,000 persons per square mile.
- Character: Principally trip destination rather than origin.
- Land uses: Concentrations of office, commercial, or industrial.

The study areas were defined by one or more contiguous census tracts encompassing the "core" center area. This definition had the advantage of using standardized geographic regions; however, this method often brought substantial fringe non-center activities into the study areas.

Cervero (1988) defines major employment centers as at least one million square feet of office space and 2,000 or more workers. An ongoing NCHRP project (JHK 1988), which studies travel characteristics of suburban activity centers, has defined large scale centers as non-CBD areas which encompass 5 square miles (3,200 acres) or less, with at least 5 million gross square feet of office and 600,000 gross leasable square feet of retail, with some hotel and residential uses where the majority of its development occurred during the past 10 years.

Employment size and density. Two of the most important criteria in the definition of activity centers are employment size and density. Several factors can affect center density. For instance, some land uses (such as retail and industrial) tend to reduce the employment density of that center. Some centers, such as Hacienda Business Park in Pleasanton, California, have low density by design. Large growth corridors, such as the I-5 Corridor south of Portland, exhibit extremely low densities due to the enormous land areas they cover. Nevertheless, they are united by common transportation characteristics and association among the area developers.

Growth in center densities and employment do not always occur concomitantly. Within the Chicago CBD, employment growth has tended to occur in those areas which already featured high employment densities and transit use. Conversely, growth in the suburban areas has increased, but employment density and transit ridership have remained low (Soot).

Land Use Mix and Composition. Land use mix can influence the commute mode choices of suburban activity center employees. Cervero (1988) found a positive correlation between the percentage of office floor space in a center and the percentage of work trips by commuters driving alone.

Site Design and Layout. Site layouts in suburban activity centers often segregate buildings. The buildings often have separate access roads and are often placed in a "park-like"; or "campus-like" environment. These factors discourage inter-building travel by foot and convenient service by transit vehicles (Cervero 1988).

Land and Property Ownership and Management. In the examination of suburban activity centers, the number of developers and property owners, and the overall management of the center are important factors in addressing transportation issues. In Houston, property owners in the Uptown (City Post Oak) center successfully lobbied the state legislature to create a special taxing district composed of their properties. Over 54 percent of the value of the land in the special district is controlled by one developer, and another developer

controls over 12 percent of the remaining value (Uptown Houston Association May 1988). Having the center's interests controlled by a few large property owners made consensus building easier.

Organizational and Institutional Structure. There are several suburban activity centers which are defined primarily by membership in a TMO or employers' organization for that center. The I-5 Corridor in Portland is a low-density corridor containing several regional developments; the I-5 Corridor Association represents and links these developments (Oregon Business Magazine 1988). The LAX Corridor in Los Angeles is defined by the impact fee ordinance created by the city (U.S. DOT 1986).

Typology of Centers

Cervero (1988) in a study that examined the relationship between land use and transportation patterns in suburban activity centers compiled land use and transportation data for 57 suburban activity centers throughout the nation in 26 metropolitan areas. Using a cluster analysis based on scale, density, and other land use variables, the activity centers were divided into six categories:

- Office parks—low densities and comprehensive design.
- Office centers and concentrations—concentrations of freestanding office buildings.
- Large-scale mixed-use developments—a mix of land use activities over a fairly large geographic area (at least 2,000 acres in size).
- Moderate-size mixed-use developments—a mix of land uses over a relatively well-bounded area less than 1,000 acres in size.
- Megacenters or sub-cities—high total employment and densities, featuring tall buildings, retail and hotel uses, and a wide recognition as being second only to downtown.
- Large-scale office growth corridors—enormous land areas (over 20,000 acres), with employment channeled along a central arterial.

Socio-economic, demographic, and transportation-specific measures were used as a base for cluster analysis to differentiate types of suburban activity centers in the Chicago area (Prevedouros, 1988).

Stages of growth is an alternative method of center classification. Williams (TRB 1986) and Romanos (1988) have both advanced theories of evolution of suburban centers. According to Williams, the first stage of development involves construction of a transportation system, which brings housing and small retail and services shopping centers. Gradually, larger major office complexes and more dense housing develop until a major new downtown emerges in the final stage. As activity centers mature and intensify, the size and nature of office tenants change.

Romanos (1988) defines five stages of "metrotown" evolution: (1) local activity area; (2) regional activity area; (3) regional activity and employment center; (4) semi-independent metropolitan district; and (5) metrotown. According to Romanos, traffic congestion starts becoming a problem during Stage 3 when a large number of suburban commercial

and employment opportunities gain independence from the central city.

TRAVEL NEEDS AND DEMAND

Travel Patterns

Rice Center (1987) found significant differences in the travel characteristics of Houston's CBD and activity centers. CBD workers spent 13 to 23 percent more time traveling to work and were five times more likely to use transit or ridesharing than suburban workers. Parking in the CBD is usually paid for by the workers and is not associated with a particular building or development. In general, the CBD is much denser and has less through traffic than the suburban activity centers. The study concluded that activity centers, although well served by the freeway system, are not as well served as the CBD by arterials, transit, or pedestrian facilities.

Cervero (1988) found that the share of commute trips made in some manner other than single occupancy vehicles increased as a suburban activity center became denser and featured a wider variety of land uses. The incidence of ridesharing is the highest in settings with substantial commercial components. The share of work trips made by foot is highest in settings with substantial commercial components at centers with the highest proportion of multi-family housing units within a three-mile radius. Sub-cities appear to have the least peaking due to commute trips. The center groups with the highest employment densities have the slowest average speeds for employee commutes and the most congested local streets and freeways.

Based on preliminary findings from a survey of office travel characteristics in seven large scale SACs conducted by JHK (1988) for NCHRP, vehicle trip generation rates of office buildings located within SACs appear to be lower than the rates reported by ITE. The study has found that office employee transit mode shares are extremely low (about 1 percent). Auto occupancies tend to be 1.1 or less except in situations where parking is limited or there are ridesharing incentives.

Parking

In his examination of suburban activity centers, Cervero (1988) determined that the number of parking spaces per employee was influenced most heavily by the percentage of total floorspace in retail use. Parking spaces per employee tended to decrease as the cost of that parking increased.

Rice Center (1987) found that the Houston CBD has higher parking costs, fewer parking spaces per employee, and greater distances from the parking site to the worksite than is found in any of the centers.

The JHK (1988) survey has found that in five out of six SACs less than 6 percent of office employees pay for parking. Bellevue is the exception with 25 percent paying for parking.



THE NATURE OF THE CONGESTION PROBLEM

According to Cervero (1988), land use and physical design characteristics of suburban centers have contributed to the decline of mobility by inducing most workers to drive alone. Cervero has determined that the three major site variables which appear to influence employee travel behavior and local traffic conditions around activity centers are density, size, and land use mix. The centers with the highest densities have the highest incidences of ridesharing and transit usage, the slowest employee commutes, the worst levels of service on connecting freeways and arterials, and lower levels of parking supply. The paradox of density in suburbia appears to be that in the near term, as long as most employees drive to work, local streets invariably become more congested as activities intensify; however, over the long haul, density is necessary to build up a ridership base to sustain transit and ridesharing services. The study found that centers with available housing tended to have less congestion on connecting roadways. The size and scale of the centers was found to increase congestion of local arterials and freeways. Large developments also were found to experience greater peaking of employee arrivals and departures.

Many suburban office projects were found, in general, to be insensitive to the needs of pedestrians, cyclists, and transit users. Additional negative influences on suburban mobility were the abundance of free parking and employment-housing mismatches.

Deakin (1988) has offered seven views of analyzing the suburban congestion problem with corresponding ways to address the problem. One view is that the problem is due to inadequate financing. A second view is that the problem is one of institutional shortcomings. A third diagnosis of the problem focuses on improper pricing of transportation facilities and services. Other views of the problem emphasize failures in transportation planning practices and inability to control land development. Deakin concludes that: (1) competition among local governments for tax dollars and economic growth works against rational land use and transportation planning; (2) strategies to alleviate congestion are expensive to difficult to implement; and (3) there is lack of confidence in the ability of current institutions to solve transit problems.

MANAGEMENT/ORGANIZATIONAL APPROACHES

Management/organizational approaches involve changing the manner of providing transportation service to meet the goals of the public or private sectors on an institutional level. For example, a metropolitan area may create a new management organization, or it may shift the management of the service to another organization (public or private). On the other hand, an agency may take internal actions to improve efficiency.

A TRB Conference on Organizational Responses to the Changing Transit Environment (TRB 1988) concluded that there are many innovative transit agencies that recognize the need to be more entrepreneurial and become more involved in suburban problem solving through zoning commissions, transportation management associations in partnership with the business community. There is no single model for suburban strategies. The organizational form depends on local conditions, pressures, and opportunities. State legislatures are often best positioned to stimulate transit organizational change because they are most responsive to regional issues, however specific solutions should be left to operating agen-

cies charged with implementation.

Private sector organizations also have a role to play in solving the suburban mobility problem. In his examination of increasing suburban traffic congestion, Orski (1986) identified several private sector initiatives appearing in response to this problem: private developer participation in the cost of transportation infrastructure; promotion and mobilization of public support for local funding initiatives; employer and developer assumption of greater responsibility for and participation in the control of traffic generated by new development; and new institutional arrangements (such as Transportation Management Organizations) to manage transportation in the suburbs.

Transportation Management Associations (TMAs)

In a report on downtown TMOs (TMO, another name for TMA), UMTA (*The Transportation Management Organization*) determined that TMO's are single-purpose, non-profit corporations formed so that employers, developers, and retailers can collectively address transportation-related problems. These groups can have a profound effect on and influence over the transportation options of downtown-bound travellers. Employer policies on parking and commute benefits (ridesharing incentives, bus pass subsidization) have an impact on transportation demand; retailer policies on hours of operation and deliveries also have an impact on the system; finally, developer policies and practices on location, parking supply, and access can have a significant impact on transportation. Therefore, businesses and private organizations in the downtown are beginning to realize the profound effect their policies and practices can have on the transportation system and the potential role they might play in managing that system to everyone's benefit.

The downtown, for example, already has extensive transportation infrastructure and services in place. The issue therefore is not one of building new capital facilities or inaugurating totally new services or technologies, but of better utilizing the system by managing the demand for transportation within the given capacity of existing facilities and services. Finally, it is in the collective self-interest of the business community to work together. Downtown employers, retailers, and developers would not form business organizations if they did not realize the synergistic benefits of collective advocacy and action.

To determine what motivates the private sector to form TMAs, Lockwood (1988) conducted a nationwide telephone survey of 28 transportation management associations and related organizations. The survey found that the predominant reason for TMA formation was concern about future congestion. Other motivations included: existing congestion and the desire of developers to organize advocacy for area needs.

Transit and ridesharing programs seem to be the main focus of TMA transportation improvement efforts. The TMAs encourage developers and employers to provide preferential parking and shuttle services, subsidize transit services, and monitor transportation conditions. It was determined that TMAs play a major role in marketing and coordinating existing programs, advocating roadway improvements, and bringing major activity center transportation problems to the attention of the public and private sectors. Lockwood's survey found that in the last two years several TMAs have been involved in the development of travel demand management ordinances. According to Lockwood "this may suggest a

growing recognition that purely voluntary approaches are having limited impacts as well as a growing recognition of the need for more carefully coordinated public/private cooperative programs."

Productivity Improvement

Numerous approaches toward productivity improvement exist. These approaches include the use of new technology, employee motivational programs, changes in work methods, and organizational changes. Moreover, attention has been focused recently on the "ripple effects" produced by transit service contracting. This new term describes the cost saving changes which occur within an agency due to the threat of required contracting for service. These effects can be quite large. For instance, Tidewater Regional Transit (TRT), which serves southeastern Virginia, began a competitive contracting program in the early 1980s. The threat this presented to the labor union allowed Tidewater to receive significant cost-reducing concessions in its contract negotiations. As a result of the in-house ripple effects that accrued from the contracting actions, the TRT union was able to underbid the private sector for the right to provide most of its competitively procured services. Other similar ripple effect successes have been noted in Portland, Oregon; San Diego; and San Antonio (Cervero, March, 1986).

Special, Quasi-governmental Agencies

Special transportation authorities are not operated directly by elected officials and therefore are somewhat insulated from the political, bureaucratic, and other problems of local government agencies. This approach, however, also insulates the service from public control and from the need to compete for funds against other public services (Hatry, 1983).

TRANSPORTATION IMPROVEMENT STRATEGIES

Various strategies exist for improving mobility in and around activity centers. The strategies vary in their reliance upon public and private sector participation, from simple encouragement to full implementation. They address both supply management and demand management strategies (Pratt 1988). Supply management consists of infrastructure for transportation such as the arterial and freeway system. Demand management includes ridesharing programs, modified work schedules, and mixed land use development. Parking facilities, preferential HOV facilities and transit facilities improvements can be classified under either category. Lockwood (1988) has further characterized each strategy by the time frame required for implementation. The figure below categorizes these strategies by short and long-term actions.

Figure 2-1. Congestion Reduction Tool Kit

SHORT TERM		LONG TERM	
S	• Arterial Continuity	• Superstreets	
U	• Access Management	• New Suburban Expressways	
P	• Intersection Improvements	• Suburban HOV Prioritization	
P	• Improved Ramps/Interchanges		
L	• New Suburban Bus Service		
Y			
D	• Flexible Arrival Policy	• Land-Use Mix	
E	• Ride-Sharing	• Urban Design	
M	• Growth Management	• Land-Use Development Strategies	
A	• Parking Management		
N	• Flow Control		
D			

Source: Lockwood 1988.

The effectiveness of these strategies especially in demand management, depends on the strength of enforcement. Under a tough implementation measures scenario, Pratt (1988) has concluded that a traffic reduction on the order of 10 percent is attainable. Travel demand management cannot effectively operate without the supply of the appropriate infrastructure.

Supply Management Strategies

There are several ways in which the traditional government duty of providing mass transit services can be assumed or assisted by the private sector. These range from turning the service completely over to a private firm, as in franchising, to encouraging more private firm participation through the alteration of regulations or tax policies (Rice Center 1985, August 1987, Hatry 1983).

A second approach intended to improve public transit involves several municipalities joining together to provide service. A policy of cooperating, consolidating, or contracting with other government entities can bring efficiencies by taking advantage of economies of scale and specialization.

Bus Service. Densities on both the residential and the employment ends of suburban transit routes are usually too low to support conventional fixed-route bus service. Furthermore, traditional bus routes which provide radial service from the suburbs to the CBD no longer meet commuter's needs. One approach which might be used to meet the trend of cross-town commuting, would involve converting radial downtown-oriented route structures to networks that use business parks, shopping malls, and other activity nodes as timed transfer points. Another approach utilizes intersuburban private bus lines and vanpools which offer door-to-door service can be very successful where not over-regulated or prohibited (Cervero, Autumn, 1986).

Under sponsored pass programs, participating firms distribute monthly transit passes through the workplace to their employees, usually at a discounted price. The discount may be subsidized by the transit agency, the employer, or both. The program reduces traffic to the workplace. The program may be viewed by the employees as a job-related benefit. Transit Center, a New York City public/private partnership, developed in 1987 "Transit Check", a regional transit benefit program offered by employers in the Manhattan business district (Rice Center, May 5, 1988). Other such programs have been implemented in Houston (American Public Transit Association, Jan. 28, 1985); Seattle; and Connecticut (UMTA, 1985).

Private People Movers. A privately financed and developed people mover is being built in Las Colinas, a master-planned suburban community in the Dallas metropolitan area. The grade-separated system is unique in that developers are required to build the portion of the elevated guideway system through whose site the guideway passes. The system represents the first time in a suburban center that a medium-capacity automated transit system has had its guideway infrastructure privately designed and constructed (Rice Center, April, 1987).

Rail. Traditionally, rail service has developed to address travel to and from the CBDs. Several older suburban centers like Bethesda, Md and suburban centers in the Atlanta region experienced significant growth in office, retail and high density residential development when rail served their areas (Rice Center, February 1987). In Denver, Colorado, the developers of the Denver Technological Center (DTC) have taken the initiative to develop a fixed-guideway transit system from downtown to the suburban center (Rice Center, December, 1987a).

Pedestrian Improvements. Pedestrian travel is tied much more closely to the layout of an urban activity center than post-development improvements. Taller buildings in clusters and mixtures of office, retail, and entertainment uses encourage walking. The emphasis upon parking near to offices often causes parking lots to completely envelop the buildings they serve. This encourages auto use and guarantees transit stops will be uncomfortably far from the buildings served (Cervero 1986).

Demand Management Strategies

Ridesharing. Ridesharing's role in suburbia will be limited so long as gross imbalances exist between where people live and where they work. While 19.4 percent of metropolitan area commuters nationwide carpooled to work in 1980, among suburban employees the figure was below 15 percent. The detached layouts and sheer size of many suburban business parks have further discouraged ridesharing. The fear of being stranded without a car at midday is one of the biggest deterrents to ridesharing in suburban workplaces. A survey of 2,500 employees at the mixed-use South Coast Metro in central Orange County, California, found that 45 percent needed their cars for personal reasons and 83 percent needed them to run business errands at least once a week. One way around this problem would be to make company cars and idle vans available to rideshare participants during the midday. In general, ridesharing's future in suburbia hinges largely on employers themselves getting actively involved (Cervero, Autumn, 1986).

Modified Work Schedules. Allowing workers to arrive and depart at different times of the workday could help spread out the rush-hour crunch along many suburban corridors. The transit agency may support modified work schedules through a variety of marketing techniques in an attempt to reduce the need and demand for their services. The reduced demands placed on the agency for peak services allows the agency to reduce its expenditures (Hatry, 1983).

Nationally, an estimated 39 percent of all large suburban workplaces have some form of modified work schedules—flex-time, staggered work hours, or multiple work shifts. In several instances around the country, however, urban businesses have discontinued flex-time because their office functions were considered too time-interdependent (Cervero, Autumn, 1986).

Trip Reduction Ordinances. Ordinances may be used to require urban activity center employers to address the problems caused by auto congestion. Local governments in California have supported ordinances which would increase the use of vanpools, modified work schedules, ridesharing, or other actions which reduce the need and demand for peak hour or extra service. Trip reduction ordinances offer employers considerable latitude in dealing with their unique mobility problems. Since all large employers are affected, not just the tenants of new developments, these ordinances can promote inter-company coordination of ridesharing. What is perhaps more important, they respond to congestion by altering standard commuting practices rather than increasing the vehicle-carrying capacity of thoroughfares. The true litmus test of trip reduction ordinances, however, is whether they can be enforced. Since most ordinances require surveys of employee commuting only once a year, there's always the possibility of unrepresentative sampling, especially when workers know they are being monitored (Cervero, Autumn, 1986).

Parking Reduction Policies. This action is usually instituted by an area government in order to induce developers to plan for transportation modes other than solo auto travel for workers in an urban activity center. In Los Angeles, California; Hartford, Connecticut; Orlando, Florida; St. Petersburg, Florida; and several other areas around the country, recently adopted ordinances allow developers to reduce code-required parking if they make a commitment to ridesharing.

These ordinances unfortunately have had little success inducing developers to purchase employee vans rather than pave parking lots. Many developers consider the tradeoff of parking for vans simply too risky. Parking is widely perceived as a one-time, up-front investment with a proven track record. Moreover, it is a permanent fixture to the land. In contrast, suburban ridesharing programs are largely untested and require ongoing funding support. Nor are they permanent. A ridesharing program can fold at any time, whether because of a sudden plunge in gasoline prices or because of an economic recession or loss of interest. Perhaps just as important, some lenders have frowned on past attempts to introduce below-standard parking, threatening to withdraw investment loans unless a standard amount of parking is provided. Developer resistance is also increased by lengthy delays in processing and approving requests as well as the absence of explicit criteria for evaluating the success of ridesharing substitution (Cervero, Autumn, 1986).

Mixed Land Use Development

Dunphy (ULI, 1987) has found that fast growing DuPage County, Illinois, is divided between mitigating impacts of increased traffic and seeking economic benefits that result from growth. The Urban Land Institute (ULI) study team felt that the community needed to decide among three choices: Clustered growth, campus-style development, and continued uncoordinated growth.

Jerry B. Schneider (UMTA, 1981) who examined the relationship between transit and activity centers, concluded that a city that has several relatively high density clusters of activity (*i.e.*, the polycentric city) is better able to support a viable public transit system than one that has only one major center (*i.e.*, the monocentric city). The report examines the promotion of this concept by city planning departments, based on the expectations that the polycentric urban form will reduce congestion problems and energy requirements, and aid the improvement of air quality. At the same time, it will provide places other than the central city for low income people to live and make the outer parts of the city more self-sufficient.

Deakin's (1988) recommendations to improve suburban mobility include easy and inexpensive transportation strategies that are consistent with consumer behavior and sound economic principles. Local governments are encouraged to take greater responsibility for innovative planning of transportation strategies in coordination with land use development.

Regional property tax-base sharing. As a means of correcting the problem of local governments competing among each other for tax revenues, Minneapolis-St Paul and the Meadowlands in New Jersey are practicing tax-sharing. In the Twin Cities, local jurisdictions share about 28 percent of the region's property tax base (Cervero 1988). In the Meadowlands, a 32-square-mile center near New York City, a regional commission controlling development apportions property tax revenue among 14 municipalities, some of which have severe restrictions on growth.

Fair-share housing requirements. To address the problem of jobs-housing imbalances, the New Jersey Supreme Court's Mount Laurel ruling requires municipalities to provide low and moderate-income housing (Cervero 1988). The State Planning law adopted in January 1986 would allow the Court's rulings to be implemented through the legislative and administrative processes (DeGrove 1988).

Initiatives to control of suburban growth. Due to insufficient infrastructure to serve fast growing areas, growth management has emerged as a major public policy issue. The States of Florida and New Jersey, which both have intense pressure toward suburban growth, have recently made efforts towards adopting growth management policies. Florida's Growth Management Act of 1985 is designed to protect environmentally sensitive areas, ensure more compact development patterns, and guarantee that development is serviced by adequate infrastructure. The State requires that local governments set standards for services as part of their local plans and approve only developments that can be served by existing public facilities or that developers provide for the needed infrastructure improvements. According to the new New Jersey State Planning Law, state funding for infrastructure projects will be channeled only for new development in growth targeted

areas (older cities and suburbs). State environmental permits would be withheld for projects in limited growth areas. It would be up to developers to pay for roads in such areas (Cervero 1988; and DeGrove 1988).

FINANCING APPROACHES

Constrained with limited financial resources, local governments are increasingly looking toward the private sector as a major partner assisting them in implementing transportation facilities and services. The private sector can contribute in a variety of ways including financing traffic and planning studies, developer donations of right-of-way and roadway improvements, and joint development of transit sites. Local governments can motivate the private sector contributions by offering to relax building and zoning codes. Traffic impact fees and special assessment districts also have been used as means of obtaining private funding (Rice Center December 1986).

Assessment Districts

Rice Center (July, 1987) determined that special assessment districts are an effective means of financing a variety of transit improvements, and have a high revenue potential for financing both capital and operating costs. Special quasi-governmental organizations such as assessment districts are not operated directly by elected officials and therefore are somewhat insulated from the political, bureaucratic, and other problems of local transit agencies. Revenue can be raised with fewer obstacles (e.g., fees can be more readily set to cover full cost, capital as well as operating costs). This approach, however, also insulates the service from public control and from the need to compete for funds against other public services.

A number of suburban communities, particularly in California and Florida, have formed benefit assessment districts. In Texas, Colorado, and Maryland, landowners themselves are forming road utility districts to finance needed areawide road improvements. Benefit assessment districts are popular because they pass costs on to those who benefit and they generate monies for areawide benefits. Problems can arise in deciding where to draw district boundaries and how to elicit full support among property owners within those boundaries (Rice Center July, 1987).

Ordinances and Impact Fees

In response to increased traffic congestion caused by new developments in urban areas, some communities have responded with ordinances limiting new developments, or with the imposition of impact fees. Impact fees are imposed to make new developments responsible for the infrastructure improvements they require. This removes or alleviates the taxes upon the previously existing developments to pay for new improvements.

The use of development fees is most prevalent in California and Colorado. Cities in Colorado have the longest history of using development fees, and their fees are more sophisticated and refined than in other parts of the country. In California, the widespread

use of development fees is a relatively recent phenomenon and is largely attributable to the passage of Proposition 13 in 1978. Many of the fees differ substantially from development fees in other parts of the nation, however, in that they are enacted as taxes by "charter cities" under their home-rule powers. As such, the revenues go into the general fund, as do all other tax revenues, rather than being earmarked for specific infrastructure expenditures (ULI, 1986).

User Fees

Users of a service are charged a fee based on the amount of use they receive from a government-supplied activity. This approach puts the fiscal burden on users of the activity. The reduced demands placed on the transit agency for the service allows the transit agency to reduce its expenditures for the service, or raise more money to pay for the service (Hatry, 1983).

Tax Revenues

Rather than attempting to reduce service levels or expenditures, a government can attempt to increase its revenues through increased property taxes, sales taxes, fees and charges, or grants from other levels of government. Local sales taxes to meet transit needs are used in many cities, including Houston. Since 1972, California has used state sales and fuel taxes to support public transportation services in the state (U.S. DOT, 1986).

Development Bonuses

Development bonuses are ordinances which mandate aid to mass transit, yet offer loosening of a zoning ordinance if desired action is taken by a developer. For example, in New York City, developers must relocate subway sidewalk entrances inside property lines within the Midtown Special District. In return, the developer receives up to a 20 percent floor-to-area ratio bonus (U.S. DOT, 1986).

Negotiated Agreements

Frequently, expansion of transit services offers opportunities to both the public and private sector. Public/private partnerships recognize the mutual interest in certain actions, and are willing to work together and share costs in order to increase the likelihood of success of the action which meets the goals of both sectors. Examples of this are joint development agreements, negotiated land leases, system interfaces, expanded service agreements, negotiated investments, and facility leasing. The transit action often would not have been undertaken by one sector without the support of the other.

Joint Development. Joint Development is the construction of public facility such as transit centers in conjunction with the development of private complex, which may include office and residential space, parking, inter-city carriers, connections to adjacent developments and taxi-stands. Joint development guarantees the development will have easy transit availability, which reduces parking requirements and increases accessibility; the transit agency is guaranteed station use, and often lease revenue. Major joint development applications have been used for a transportation center in Cedar Rapids, Iowa (U.S. DOT,

1986); the Dadeland South project in Miami, Florida (American Public Transit Association, June 2, 1986); and the 47-story Peachtree Center in Atlanta, Georgia (Rice Center, 1979).

Negotiated land leasing, the practice of leasing land to a transit agency for a nominal amount, and system interface, a commercial tie-in with a transit system, allows the transit system to share the cost of the system with the development which receives benefits from it. Examples include Tacoma, Washington, (US DOT 1986), Phoenix (UMTA 1985), Washington D.C. (U.S. DOT, 1986); Secaucus, New Jersey (Transportation Research Board, 1985); and Newark, New Jersey (American Public Transit Association, June 16, 1986).

Voluntary Transit Promotion

Voluntary transit promotion includes private sector actions which encourage the usage or expansion of existing transit services. These include bus service promotion, merchant subsidies and promotions, sponsored days and donations for capital improvements (U.S. DOT, 1986).

CHAPTER 3. MAJOR ACTIVITY CENTERS

One of the major purposes of this project is to develop a national data base on mobility problems in major activity centers, the transportation solutions practiced, and the local financing and management arrangements used to implement transportation programs. The general approach is to gather information from knowledgeable individuals representing major activity centers across the country. The implicit goal is to use these experiences in developing general policy recommendations for future practices. In order to accomplish this goal the following tasks were attempted:

- (a) identify differences between the mobility problems of suburban activity centers with those to downtown centers,
- (b) identify different types of public and private sector participation approaches to transportation solutions, financing and management which have been implemented to solve these problems, and
- (c) identify how and why these approaches were selected, and whether these approaches are successful in solving the mobility problems.

METHODOLOGY

The study was designed to measure six general categories of variables:

1. type of suburban activity centers,
2. travel characteristics
3. type of mobility problems,
4. type of transportation actions,
5. type of institutional organization, and
6. type of financing techniques.

The type of activity center, travel characteristics and management structure variables are considered as predictor variables. On the other hand, the transportation system approaches, and financing strategy variables are considered as the response variables. Following are a few examples of the type of relationships analyzed:

- the type of activity center and transportation system approaches implemented,
- the type of activity center, mobility problems and transportation system approaches implemented, and
- the type of activity center, management (organizational) structure, transportation system approaches implemented, and financing strategy.

Information on the first two variables was obtained through data gathered by Dr. Robert Cervero of the University of California, Berkeley in August 1987 as part of an UMTA

funded project administered through Rice Center. That project identified and collected information from 57 major employment centers in 21 different states and 26 metropolitan areas on land use, design, and travel characteristics on suburban employment centers. According to Cervero (1988), suburban employment centers are defined as having over 2 million square feet of leasable space and/or with work forces over 5,000 employees.

Rice Center completed part of the missing information, verified the available data, expanded the number of observations by seven additional suburban centers, and supplemented the data base with additional information. Similar data for the CBDs in 22 metropolitan areas was collected.

Rice Center obtained its information through telephone and written interviews with individuals in the major employment centers identified by Dr. Cervero. In addition, MPOs in the 23 metropolitan areas were contacted and asked to verify and supplement the available data for all major activity centers in their respective regions (see Figure 3-1).

The final draft of the questionnaire is included in the Appendix A. The questionnaire contains 70 items. The first part of the questionnaire covers issues included in the Cervero data base such as:

- scale and locational characteristics,
- land use characteristics,
- employment characteristics,
- density and design characteristics,
- land ownership characteristics,
- workforce travel characteristics, and
- site and areawide transportation facilities, services, and conditions.

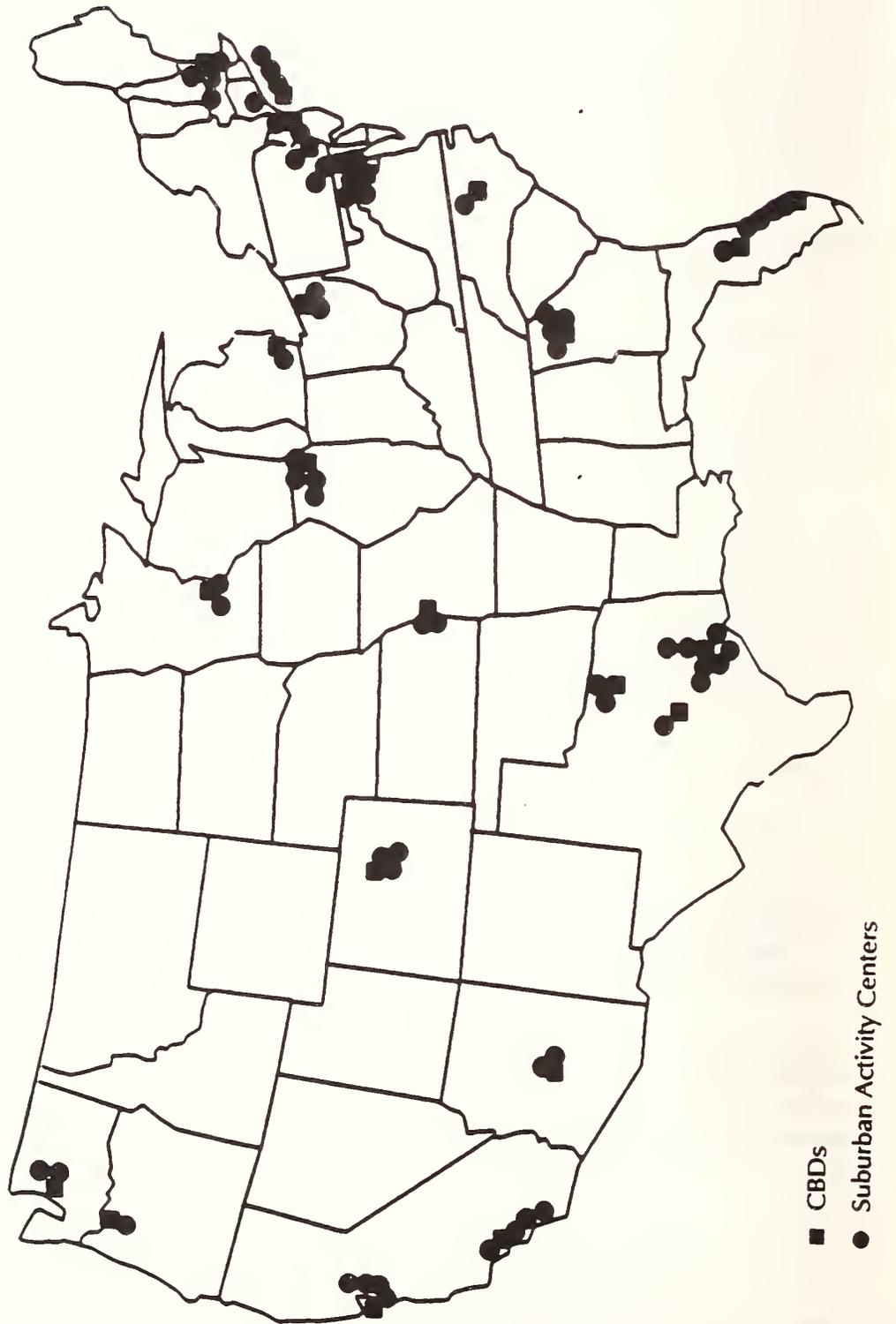
The second part covers:

- perception of the congestion problem,
- transportation actions,
- financing actions,
- organizational mechanisms,
- additional information regarding the activity center, and
- information on successful transit related program.

Questionnaires were tested with representatives from three suburban centers, the CBD and the MPO in Houston. Census tract maps of each area were sent with the questionnaires requesting that the boundaries of the center be identified. Additional information was later obtained on regional characteristics from U.S. Statistical Abstract 1988 for population, employment from U.S. BLS, and rate of growth for each of the 23 metropolitan areas.

Responses to the survey were uneven. About half of the suburban center contacts complied with the data request within the time allotted; a smaller proportion of CBD contacts complied; and a few responses from MPOs were received. The quality of responses varied widely. Most contact persons answered about half of the questions

Figure 3-1. Location of Activity Centers



asked. Moreover, very few persons returned the maps. Research staff followed-up by telephone to solicit responses from non-respondents. Subsequently, an abbreviated version of the questionnaire with 26 items was mailed to persons who did not respond. About half of those responded. Final telephone calls were made in a few cases where critical data was still missing or to resolve contradictory information from different sources. By July 1988, 85 responses (64 SACs and 21 CBDs) with reasonably complete data were obtained.

ANALYSIS OF RESULTS

The Rice Center survey, together with post-survey research, yielded in excess of 100 variables. This section presents statistical summaries and analyses of data drawn from 61 variables for which samples of sufficient size and validity were developed. The balance of the variables were not considered to be sufficiently developed and were not included in this analysis. For the purpose of analysis, the 61 variables were grouped into the following categories:

- SAC Typology
- Location
- Regional Characteristics
- Size
- Density
- Land Use Mix
- Travel Characteristics
- Transportation Facilities
- Mobility Problems
- Organizational Mechanisms
- Financing Mechanisms
- Business Actions to Address Problems
- Government Actions to Address Problems

For continuous variables, calculations were made of the mean, median, mode, standard deviation, and the minimum and maximum values. These calculations were made for each type of SAC. In addition, all the SACs were grouped together to compare them with the CBDs. Using these two approaches facilitated comparisons among and between SACs and CBDs. Similarly, for discrete variables, cross-tabulations were constructed, Chi-Square and Probability statistics were calculated and, where applicable, Fisher's Exact Test was applied to the results of cross-tabulations. Furthermore, for selected variables, analysis of variance (ANOVA) was conducted as an added measure of the significance of relationships between variables.

Types of SACs

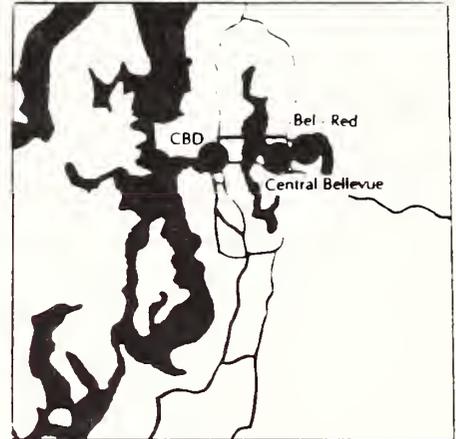
The 64 suburban activity centers were classified into six types, roughly corresponding to definitions set out by Cervero (1988). A brief review of the important definitional aspects of each of these types follows.

1. **Office Parks 11 centers** - Office parks are master-planned developments characterized by low densities, low building heights, heavy landscaping, ample parking, highly controlled appearances and coordinated building designs. The smallest of the SACs, they contain less than 1,250 acres. More than 65 percent of their space is in office uses. An example is Hacienda Business Park, Pleasanton, California.
2. **Office Centers 11 centers** - Office centers are similar to office parks but are larger and denser. They have less parking than office parks, little, if any, on-site housing, and most are not master-planned. Office centers contain at least 2.5 million square feet of floor space and are typified by Greenway Plaza in Houston and North Carolina's Research Triangle.
3. **Large Mixed-Use Developments (MXDs) 18 centers** - This is the largest SAC category. Large MXDs host a mix of land-uses and cover a large area (at least 1,700 acres). Their boundaries are not always clear, and less than two-thirds of their total floor space is in office use. Examples of large MXDs are BWI Airport Center in Maryland and West Houston, Texas.
4. **Moderate Mixed-Use Developments (MXDs) 6 centers** - These centers are similar to the large MXDs, but have far less acreage and lower density (less than 2,300 acres with between 30 and 50 percent of floor space in office use). They have a predominance of low-rise to mid-rise buildings, a well-defined core, architecturally integrated building clusters, and clear boundaries. Hunt Valley, Maryland is a moderate MXD.
5. **Megacenters 12 centers** - Called "suburban downtowns," "urban villages" and "sub-cities," megacenters are located on the fringes of large cities. They have a land use mix similar to downtown areas: Offices are the predominant use and they have high density, parking garages, shopping malls and, frequently, convention hotels. Often there is a housing element (usually higher-priced condominium or townhouse). Megacenters have more than 13,000 office workers and more than 4,500,000 sq.ft. of office and commercial space. Tyson's Corner, Virginia, Houston's Post Oak, and Parkway Center in Dallas all are megacenters.
6. **Large Corridors 6 centers** - The largest, most sprawling and most diverse of SACs, large corridors have more than 40,000 acres, with growth channeled along major arterials or freeways. They contain numerous concentrations of residential and commercial uses which are too small to be SACs in themselves. They also have very low employment densities (generally less than two employees per acre), but wide variations within. Most have a large number of housing units. Boston's Route 128, the Silicon Valley, and Route 1 in Princeton are examples of large corridors.

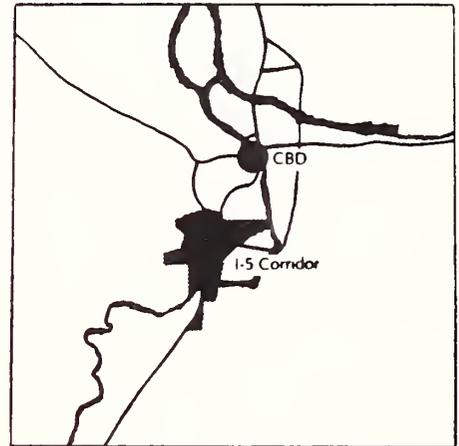
Table 3-1 provides a list of centers that responded by state and city and maps of the metropolitan areas studied with the location of activity centers.

Table 3-1. Activity Centers Studied

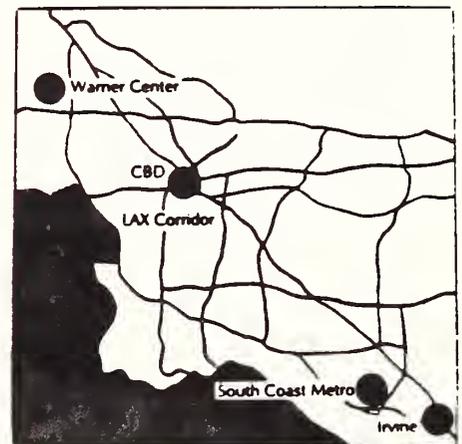
Activity Centers	Employment	Center Type
Seattle, WA		
CBD	178,000	CBD
Central Bellevue	20,000	Megacenter
Bel-Red	15,300	Moderate MXD



Portland, OR		
CBD	85,000	CBD
I-5 Corridor	31,000	Large Corridor



Los Angeles, CA		
LAX Corridor	194,000	Large MXD
CBD	175,000	CBD
Warner Center	25,000	Megacenter
South Coast Metro	25,000	Megacenter
Irvine	N/A	Office Center

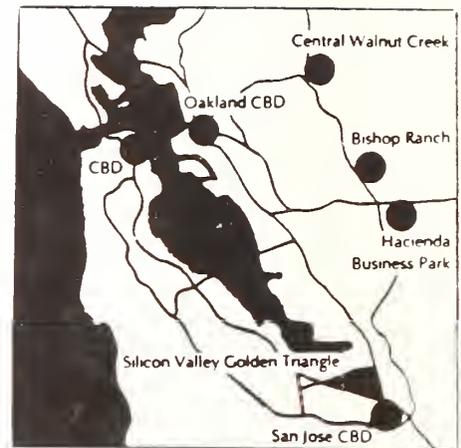


Map Scale: 1 inch = 20 miles

Activity Centers	Employment	Center Type
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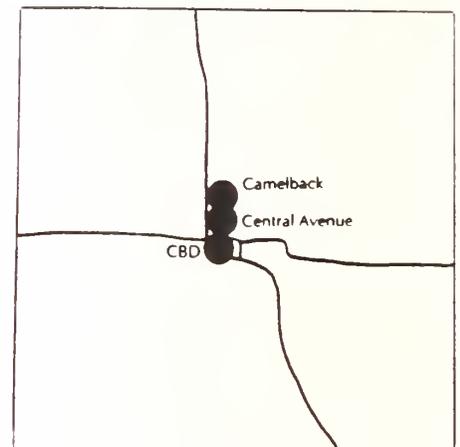
San Francisco, CA

CBD	249,900	CBD
Silicon Valley Golden Triangle	47,900	Large Corridor
Bishop Ranch	13,000	Office Park
Central Walnut Creek	10,000	Office Center
Hacienda Business Park	8,250	Office Park



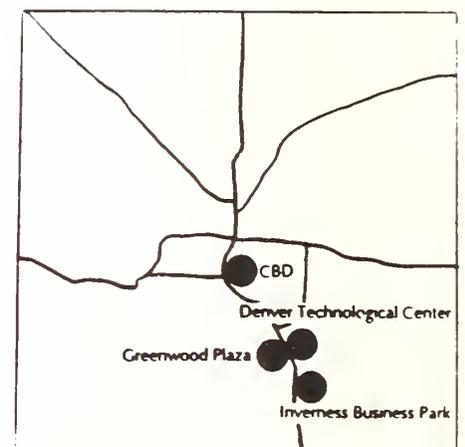
Phoenix, AZ

Camelback	40,900	Large MXD
Central Avenue	9,500	Office Center



Denver, CO

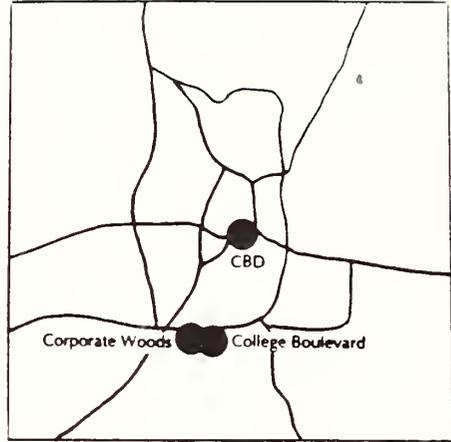
CBD	110,000	CBD
Greenwood Plaza	20,300	Office Center
Denver Technological Center	16,000	Megacenter
Inverness Business Park	9,000	Office Park



Activity Centers	Employment	Center Type
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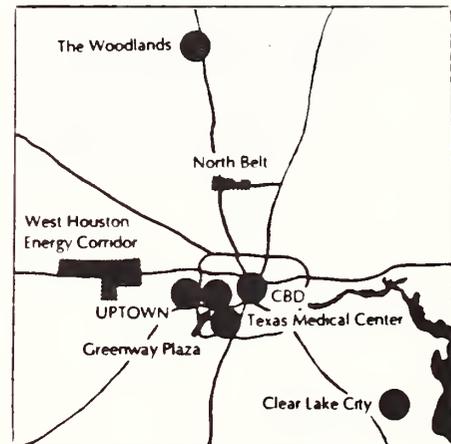
Kansas City, MO

CBD	55,000	CBD
College Boulevard	22,000	Office Park
Corporate Woods	7,000	Office Park



Houston, TX

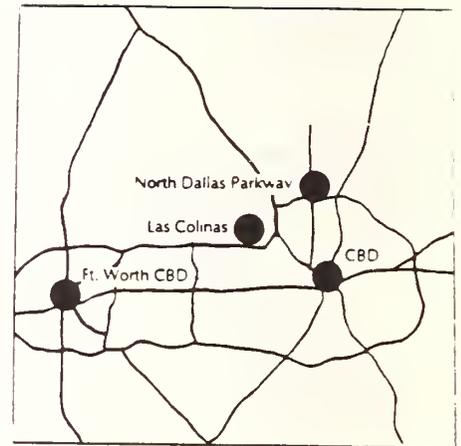
CBD	182,000	CBD
UPTOWN	75,500	Megacenter
Texas Medical Center	60,000	Office Center
West Houston Energy Corridor	28,317	Large MXD
Clear Lake City	13,000	Large MXD
North Belt	N/A	Large MXD
Greenway Plaza	9,000	Office Center
The Woodlands	6,631	Large MXD



Activity Centers	Employment	Center Type
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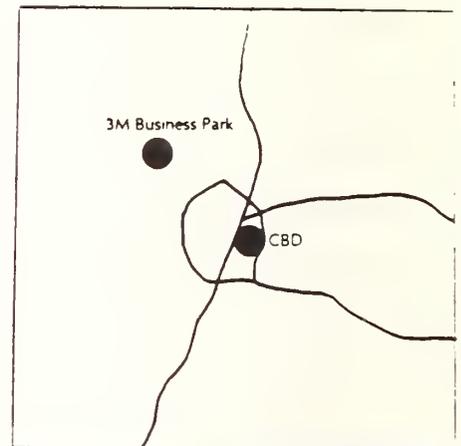
Dallas, TX

CBD	117,000	CBD
North Dallas Parkway	59,500	Megacenter
Las Colinas	15,000	Megacenter



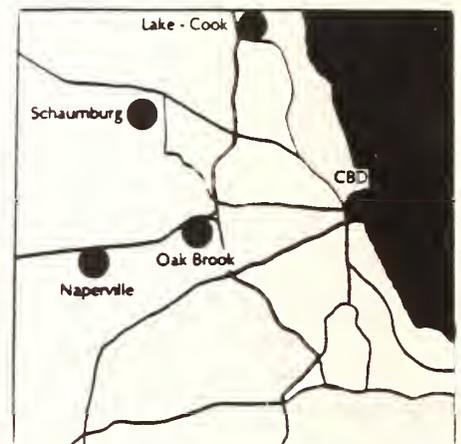
Austin, TX

3M Business Park	1,100	Office Park
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Chicago, IL

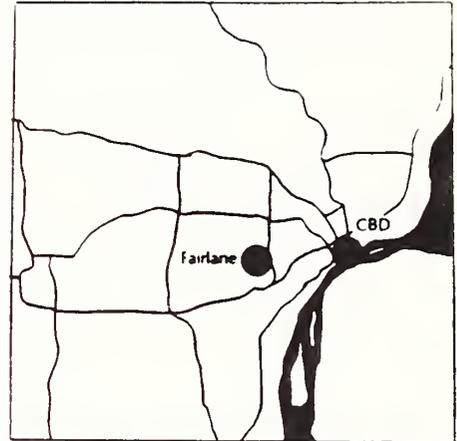
CBD	500,000	CBD
Schaumburg	45,000	Large MXD
Oak Brook	41,000	Large MXD
Lake-Cook	15,000	Office Center
Naperville	12,500	Large MXD



Activity Centers	Employment	Center Type
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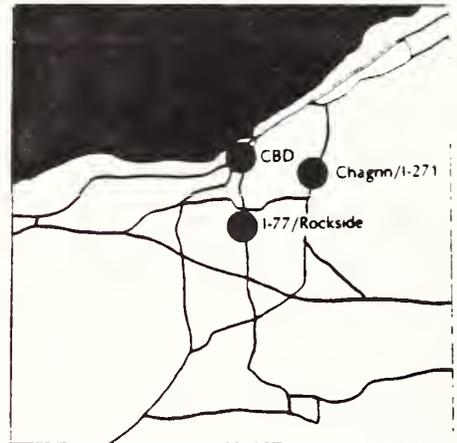
Detroit, MI

CBD	110,000	CBD
Fairlane	12,000	Moderate MXD



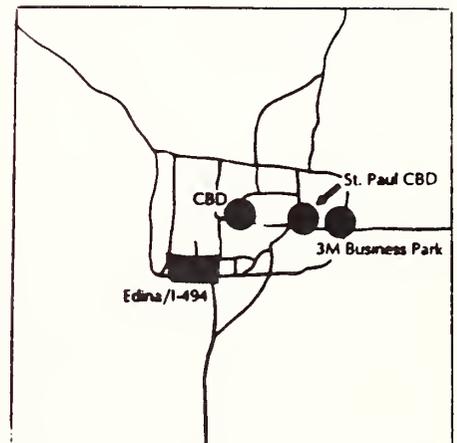
Cleveland, OH

CBD	130,048	CBD
Chagrin/I-271	8,000	Moderate MXD
I-77/Rockside	4,400	Office Center



Minneapolis, MN

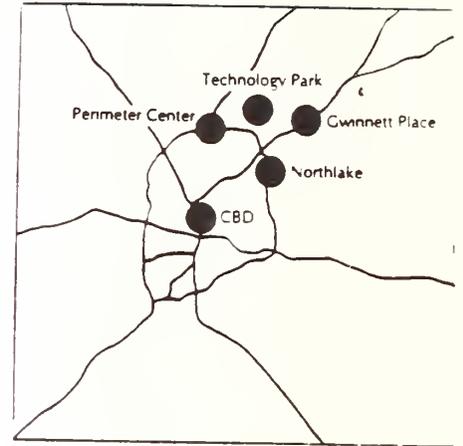
CBD	N/A	CBD
Edina/I-494	17,700	Large MXD
3M Business Park	12,700	Office Park



Activity Centers	Employment	Center Type
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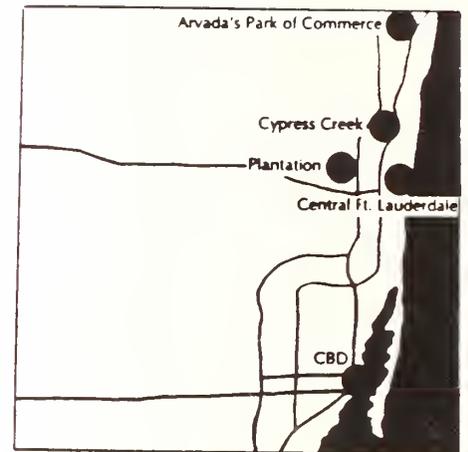
Atlanta, GA

CBD	99,171	CBD
Northlake	17,000	Moderate MXD
Perimeter Center	13,100	Megacenter
Technology Park	4,000	Office Park
Gwinnett Place	3,500	Large MXD



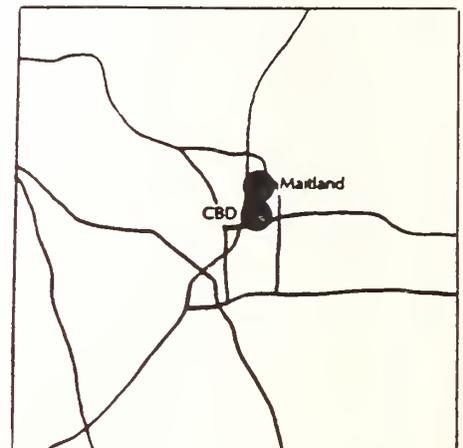
Miami, FL

CBD	109,000	CBD
Arvada's Park of Commerce	10,000	Office Park
Cypress Creek	10,000	Large MXD
Central Ft. Lauderdale	6,000	Office Center
Plantation	5,000	Large MXD



Orlando, FL

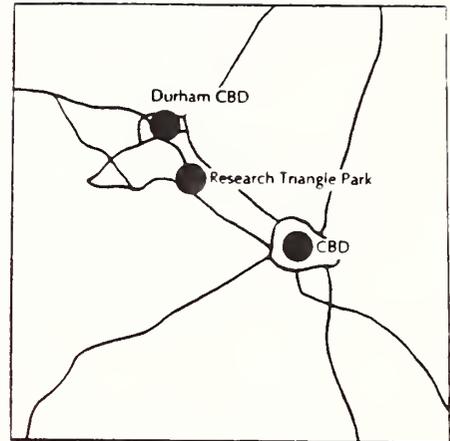
CBD	38,000	CBD
Maitland	11,962	Office Park



Activity Centers	Employment	Center Type
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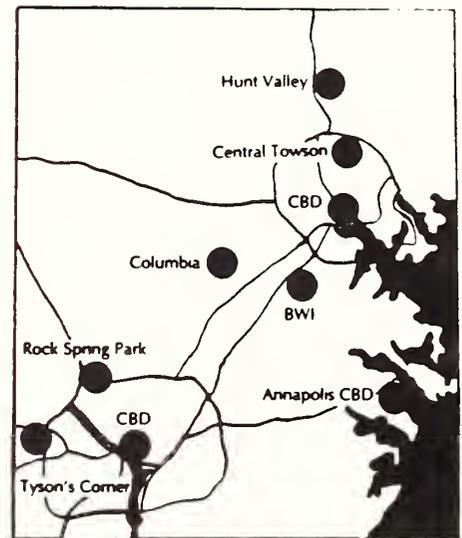
Raleigh, NC

CBD	30,000	CBD
Research Triangle Park	30,000	Office Center



Baltimore, MD and Washington, DC

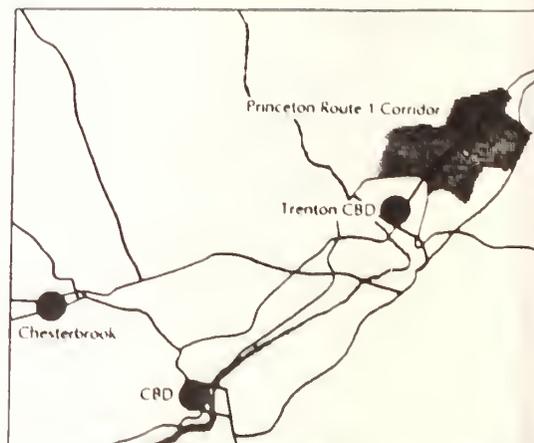
Baltimore CBD	82,000	CBD
Tyson's Corner	75,000	Megacenter
BWI	35,000	Large MXD
Central Towson	22,500	Megacenter
Hunt Valley	20,000	Moderate MXD
Columbia	14,600	Megacenter
Rock Spring	13,000	Office Center



Activity Centers	Employment	Center Type
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Philadelphia, PA

CBD	285,560	CBD
Princeton Route 1 Corridor	80,000	Large Corridor
Chesterbrook	3,200	Moderate MXD



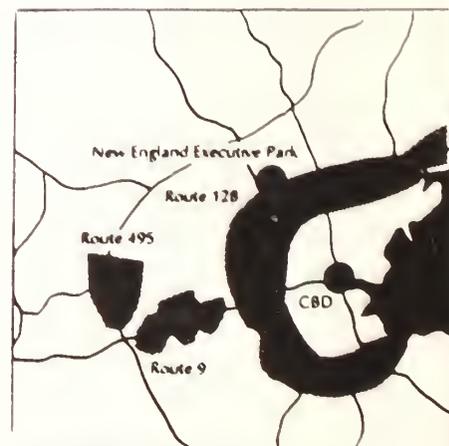
New York, NY

Lower Manhattan	1,850,000	CBD
Newark CBD	65,000	CBD
East Farmingdale	64,700	Large MXD
Hackensack Meadowlands	52,700	Large MXD
Hauppauge Industrial Park	36,270	Large MXD
Central Stamford	23,400	Megacenter
East Garden City	21,700	Large MXD



Boston, MA

Route 128	500,000	Large Corridor
CBD	375,000	CBD
Route 9	104,709	Large Corridor
Route 495	39,359	Large Corridor
New England Executive Park	4,100	Office Park



Except for a few exceptions, the additional centers covered by Rice Center's survey have been classified according to Cervero's typology. Two centers which were included in Cervero's study have been reclassified in the Rice Center study: College Boulevard Corridor has been reclassified as an office park rather than a moderate MXD; and Rockside/I-77 corridor has been changed to an office center from a moderate MXD. The analysis that follows examines similarities and differences in characteristics of these center types.

Location

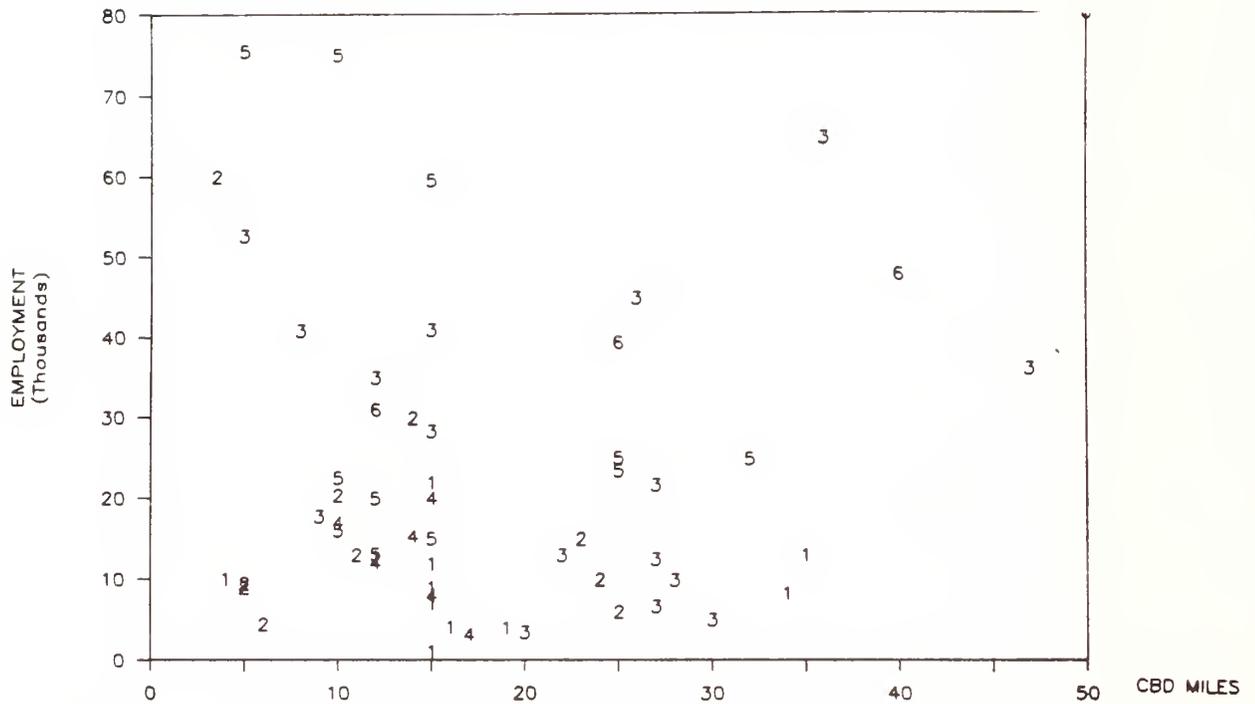
Miles from Central Business District - One universally recognized identifier of suburban areas is the fact that they are geographically separate from, but associated with, a CBD. Among the SACs studied in this analysis, Arvada's Park of Commerce (an office park) and The Texas Medical Center (a large office center) were located the closest to their CBDs, about four miles (Table 3-2). Among megacenters and large MXDs, the closest to their CBDs were the Meadowlands and Houston Uptown, both five miles from their CBDs. Most office centers and megacenters are within 12 miles of their CBDs, although the most far-flung SACs include Irvine, California, an office center located 50 miles from Los Angeles' CBD. Large MXDs, large corridors and, to a lesser degree, office parks, tend to be farther from their CBDs. The large MXDs of East Garden City/Route 25, East Farmingdale/Route 110 and Hauppauge Industrial Park are located at distances of 27, 36 and 47 miles, respectively, from their associated CBD, Lower Manhattan.

Table 3-2. Miles from Central Business District

Type of Center	Mean	Std Dev	Min	Max	Median	No. of Cases
Office Park	17.7	9.1	4.0	35.0	15.0	11
Office Center	16.0	13.8	4.0	50.0	11.0	11
Large MXD	21.5	10.7	5.0	47.0	21.0	18
Moderate MXD	13.8	2.5	10.0	17.0	14.5	6
Megacenter	15.5	8.2	5.0	32.0	12.0	11
Large Corridor	25.8	15.9	12.0	50.0	20.0	6
SAC Total	18.5	11.0	4.0	50.0	15.0	63
CBD	na	na	na	na	na	21

A scatter plot in Figure 3-2 presents the relationships between total employment in an SAC and the SAC's distance from its associated CBD. There is a virtually empty area in the plot between 15 and 22 miles. This may be due somewhat to the inaccuracies involved in asking respondents to estimate the distance between two areas of irregular sizes and shapes.

Figure 3-2. Scatter Plot of Distance from SACs to CBD Versus Employment



Note: 1=Office Park, 2=Office Center, 3=Large MXD, 4=Moderate MXD, 5=Megacenter, 6=Large Corridor

Regional Characteristics

Table 3-3 presents a summary of regional employment data from the SACs and CBDs studied for this analysis.

Regional Employment 1986 - This variable represents employment in the region where a SAC is located. The most pronounced distinction apparent in a comparison of regional employment figures for each of the SAC types is that office parks tend to be located in regions with lower regional employment figures. Both the mean and the median employment numbers for office parks are in six figures. Except for moderate MXDs, the other SAC types appear to be fairly well distributed across the size range of regional employment. Moderate MXDs tend to be located in a comparatively narrow, upper-middle range of regional employment. The smallest regional employment figure for a moderate MXD (878,200 in the Cleveland area's Chagrin Blvd./I-271 corridor) is substantially larger than the next highest minimum (535,300 in Oregon's I-5 corridor, a large corridor). The maximum regional employment among moderate MXDs (2,089,500 in Philadelphia's Chesterbrook Corporate Center) is among the smallest of all SACs, except office parks (discussed above).

Table 3-3. Regional Employment and Employment Growth Rate

<i>Regional Employment 1986</i>		Std	Min	Max	Median	No. of
	Mean	Dev				Cases
Office Park	833,100	423,651	302,600	1,675,100	786,500	11
Office Center	1,209,909	848,913	368,300	3,396,100	882,600	11
Large MXD	1,541,706	978,102	442,600	3,908,200	1,278,300	18
Moderate MXD	1,344,718	510,850	878,200	2,089,500	1,188,150	6
Megacenter	1,347,375	910,892	122,500	3,908,200	1,188,150	12
Large Corridor	1,238,750	654,632	535,300	2,096,600	1,221,650	6
SAC Total	1,279,589	810,772	122,500	3,098,200	1,078,150	64
CBD	1,437,148	1,036,740	368,300	4,055,000	1,052,500	21

<i>Growth Rates % 1980-1986</i>		Std	Min	Max	Median	No. of
	Mean	Dev				Cases
Office Park	3.54	2.40	0.11	7.50	2.41	11
Office Center	2.32	2.22	-0.33	5.61	2.38	10
Large MXD	1.69	2.25	-1.43	5.61	1.44	17
Moderate MXD	1.69	1.84	-0.33	4.70	1.40	5
Megacenter	2.34	1.69	0.11	4.70	1.73	11
Large Corridor	1.93	1.30	-0.64	3.01	2.16	6
SAC Total	2.28	2.10	-1.43	7.50	2.16	60
CBD	1.81	2.14	-1.43	7.50	1.38	20

Regional Employment Growth Rate 1980-1986 - Office parks occur more frequently in fast growing areas. The mean rate of 3.5 percent is well above the mean rates of 2.3 and 2.3 percent turned in by megacenters and office centers, respectively. The median rate of 2.4 percent nudged out the median for office centers of 2.4 percent. Only office parks and megacenters had no SACs with negative regional employment growth rates between 1980 and 1986. Florida's Mainland Center, an office park, had the highest regional employment growth rate of all SACs (7.5 percent). MXDs generally had lower average rates of employment growth between 1980 and 1986; both moderate and large MXDs were in regions with median growth rates in the range of 1.4 percent.

Size Characteristics of SACs

Table 3-4 presents summary statistics on the size, level of development, employment characteristics and regional significance of the SACs and CBDs studied in this report.

Acres - Overall, the average SAC covers 26,753 acres of land, virtually the same as found in an earlier study (Cervero 1988). They range in size from 82 acres (New England Executive park) to 839,916 acres (Princeton Route 1 Corridor) and have a median acreage of 1,700. The standard deviation of 118,377 is more than four times the mean. The Princeton Corridor, along with Boston's Route 128 Corridor (440,000 acres) are mostly responsible for the upward skew of the average acreage. If large corridors are excluded from the sample, the mean of the remaining five types of SAC drops to 3,363 acres and the median to 1,000 acres.

On average, office parks are the smallest of the six types of SAC, with a mean acreage of 570. Megacenters and Moderate Mixed-Use Developments (MXDs) average about the same acreage: 946 and 1,028, respectively; however, the smallest megacenter contains 130 acres while the smallest moderate MXD is substantially larger at 435 acres. Office centers have the greatest variability in acreage among the SACs. The mean size is 2,202 acres, but the standard deviation is 2,747 acres. These centers range in size from 127 acres (Greenway Plaza) to 7,680 acres (Lake/Cook Corridor). A Scheffe test for groups with significant differences confirms that large corridors differ significantly from the acreages of all other SAC types, as well as CBDs, and that the confidence levels for these differences all are virtually 100 percent.

One reason for the large variability in their sizes is that the boundaries of these developments sometimes are quite rigid and well-defined, and other times are more conceptual and sprawling. Greenway Plaza, for example, is an area legally defined on real estate plat maps. Its boundaries are absolutely defined. The six large corridors average nearly one-quarter million acres, with a standard deviation one-third larger. The smallest (Oregon's I-5 Corridor), however, is much larger than any of the other types of SAC.

Square Footage of Floor space - A vast amount of construction has occurred in the SACs, but they still are significantly smaller on average than their associated CBDs. Whereas CBDs average 47-plus million square feet of floor space, the largest SAC group, large corridors, averages only 29 million square feet. Large MXDs and the much more densely developed megacenters have comparable square footage figures of 15 and 14 million, respectively. Office centers and moderate MXDs group together at 6 and 5.5 million square feet of floor space, respectively. Office parks average 3.6 million square feet of space, with a median of 2.8 million.

A Scheffe test for groups with significant differences found that the amounts of total floor space in CBDs differ significantly from the total floor space figures for megacenters, office centers, large MXDs, moderate MXDs and office parks. The latter four of these SAC types have confidence levels well above 99 percent, while the confidence level for megacenters is calculated at 98.4 percent.

Square Footage of Office Space - The generally greater diversity of land uses in SACs versus CBDs is evidenced by a comparison of office space to total floor space. The mean amount of office space in SACs is 6.3 million square feet, while the mean amount of total space is 11.8 million square feet. In contrast, CBDs average 43.5 million square feet of office space and 47.4 million square feet of total floor space. Large corridors and megacenters tend to have the largest inventories of office space, averaging 18.6 million and 8.2 million square feet, respectively. Both, however, also have very large standard deviations, indicative of broad variations in land-use mix. The smallest average amounts of office space are in office parks and moderate MXDs; office parks because they simply are smaller developments, and moderate MXDs because they have diverse land uses. The absolute minimum amount of office space among the SACs is in a large MXD, The Woodlands, Texas (504,000 square feet). The largest value for an SAC is 62.9 million

Table 3-4. Size Characteristics of Centers

<i>Office Space as Percent of Total Floorspace</i>	Mean	Std Dev	Min	Max	Median	No. of Cases
Office Park	570	378	82	1,240	500	11
Office Center	2,202	2,747	127	7,680	800	10
Large MXD	8,105	7,551	1,715	32,528	5,700	18
Moderate MXD	1,028	674	435	2,360	833	6
Megacenter	946	698	130	2,240	780	12
Large Corridor	248,959	328,547	41,600	839,916	65,000	6
SAC Totals	26,753	118,377	82	839,916	1,700	63
CBD	1,268	1,428	265	7,000	985	20
<i>Total Square Footage of Floor Space</i>						
Office Park	3,589,593	2,471,924	1,253,797	9,088,000	2,800,000	11
Office Center	6,158,571	3,704,243	2,500,000	11,300,000	6,140,000	7
Large MXD	14,939,836	14,870,192	2,000,000	55,291,000	7,837,350	14
Moderate MXD	5,517,942	2,896,767	1,780,000	9,164,650	5,681,500	6
Megacenter	13,968,928	9,910,229	5,823,886	30,200,000	8,535,000	10
Large Corridor	28,999,177	29,072,071	4,502,000	85,000,000	21,005,644	6
SAC Totals	11,824,911	14,621,519	1,253,797	85,000,000	6,600,000	54
CBD	47,420,111	33,697,042	2,750,000	123,000,000	43,485,637	16
<i>Square Footage of Office Space</i>						
Office Park	2,712,587	1,828,544	1,103,341	7,375,500	2,100,000	11
Office Center	6,417,619	4,680,860	2,000,000	18,000,000	5,034,800	11
Large MXD	4,829,500	3,787,195	504,000	11,600,000	4,070,450	16
Moderate MXD	2,038,500	812,604	870,000	2,911,000	2,255,000	6
Megacenter	8,226,000	8,201,276	1,700,000	21,350,543	5,399,500	12
Large Corridor	18,569,863	25,537,898	588,000	62,900,000	9,442,376	5
SAC Totals	6,254,042	8,881,229	504,000	62,900,000	3,540,613	61
CBD	43,546,660	69,405,704	2,000,000	320,000,000	23,559,387	20
<i>Size of Work Force</i>						
Office Park	7,574	4,235	1,100	13,000	8,250	11
Office Center	17,720	16,642	4,400	60,000	11,500	10
Large MXD	36,937	44,315	3,500	194,008	28,317	17
Moderate MXD	12,583	6,185	3,200	20,000	13,650	6
Megacenter	32,050	23,566	13,100	75,500	22,950	12
Large Corridor	133,828	181,499	31,000	500,000	63,950	6
SAC Totals	34,702	67,526	1,100	500,000	15,650	62
CBD	241,284	396,581	30,000	1,850,000	113,500	20
<i>Share of Region's Employment</i>						
Office Park	1.43%	1.11%	0.24%	3.30%	1.05%	11
Office Center	2.09%	2.43%	0.44%	8.15%	1.17%	10
Large MXD	2.59%	2.19%	0.26%	8.14%	1.97%	17
Moderate MXD	1.10%	0.66%	0.15%	1.90%	1.10%	6
Megacenter	3.82%	5.03%	0.64%	19.10%	2.19%	12
Large Corridor	10.29%	10.08%	1.88%	29.85%	6.24%	6
SAC Totals	3.14%	4.65%	0.15%	29.85%	1.69%	62
CBD	14.12%	9.49%	4.48%	45.62%	13.27%	20

square feet (Silicon Valley Golden Triangle), which is nearly three times the median amount of office space in a CBD. The amount of office space in CBDs, meanwhile, ranges from two million square feet in Raleigh to 320 million square feet in Manhattan (below 60th Street).

Size of Workforce - As would be expected, the size of an SAC's workforce is in proportion to the amount of floor space in its buildings. CBDs lead by a wide margin on average, although the smallest CBD in terms of employment (Raleigh, 30,000 workers) is smaller than the smallest large corridor (I-5, 31,000 workers).

Share of Region's Employment - Ratios of the employment within SACs and CBDs to employment within their regions (usually PMSAs), provide a means of gauging the relative significance of these areas to their regions. The findings of a Scheffe test are that all SAC types, except large corridors, differ from CBDs on this variable at a confidence level of more than 99 percent. Of course in most regions, CBDs host a plurality of the regional workforce, averaging 14 percent and ranging as high as 46 percent (Manhattan). The smallest share among CBDs is Los Angeles with less than 4.5 percent of the region's total employment.

Large corridors and megacenters also have broad variations in this ratio. The spectrum for megacenters is anchored at the low end by Warner Center (0.6 percent) and at the high end by Central Stamford (19.1 percent). Large corridors, whose shares range from 1.9 percent (Mass Route 495 Corridor) to 29.8 percent (Mass Route 128 Corridor), hold a mean of 10 percent of their regions' work forces; the median share of 6.2 percent is represented by the Silicon Valley Golden Triangle and by another Massachusetts corridor, Route 9, which has a 6.2 percent share.

Although employment within office parks is the smallest of the six SAC types by most measures of central tendency, their shares of regional employment seem to equal or better those of moderate MXDs, which average about two-thirds more workers. This suggests that office parks are more likely to be located within smaller PMSAs. Perhaps, given a predisposition on the part of developers to build as much as possible and then some, office parks may be developers' best attempts to bring major office centers or MXDs to areas that cannot support grand-scale construction. In a larger market, larger projects probably hold much greater attraction than do office parks. A similar, albeit less pronounced, relationship appears to exist between megacenters and large MXDs.

Density Characteristics of SACs

Table 3-5 presents statistics on two measures of density within CBDs and SACs. Fairly good data were available relating to employment and land coverage. The density measures reported are Employees per Acre and Percent of Area Covered by Buildings.

Employees per Acre - While on several of the previously discussed measures large corridors came closest to rivaling CBDs, they are at opposite ends of the spectrum with regard to density of employment. CBDs are far and away the densest areas in terms of employment. They have a mean of 176 employees per acre and a median of 155. The lowest CBD employment density is in Orlando (38 per acre) and the highest is in Denver (415 per

acre). Among SACs, the lowest density is in large corridors, due to their greater proportions of non-employment land uses as well as to their generally lower levels of building density. Large corridors average 0.9 employees per acre with a standard deviation of 0.7. The Princeton Route 1 Corridor has the lowest employment density of all the SACs studied (0.1 per acre). The highest density among SACs is in Las Colinas, a Dallas megacenter.

Megacenters on average have the highest densities of the SACs, with a mean of 115 employees per acre and a minimum of 11.2 per acre (South Coast Metro); megacenters are the only SAC type whose minimum density is in double digits. Following megacenters in density are office centers, office parks and moderate MXDs, with averages of 27, 22 and 17 employees per acre, respectively. Much farther down are large MXDs, which average only 6.08 employees per acre. The least dense MXD is The Woodlands, Texas (0.20 per acre) and the highest density is represented by Village of Schaumburg (17 per acre).

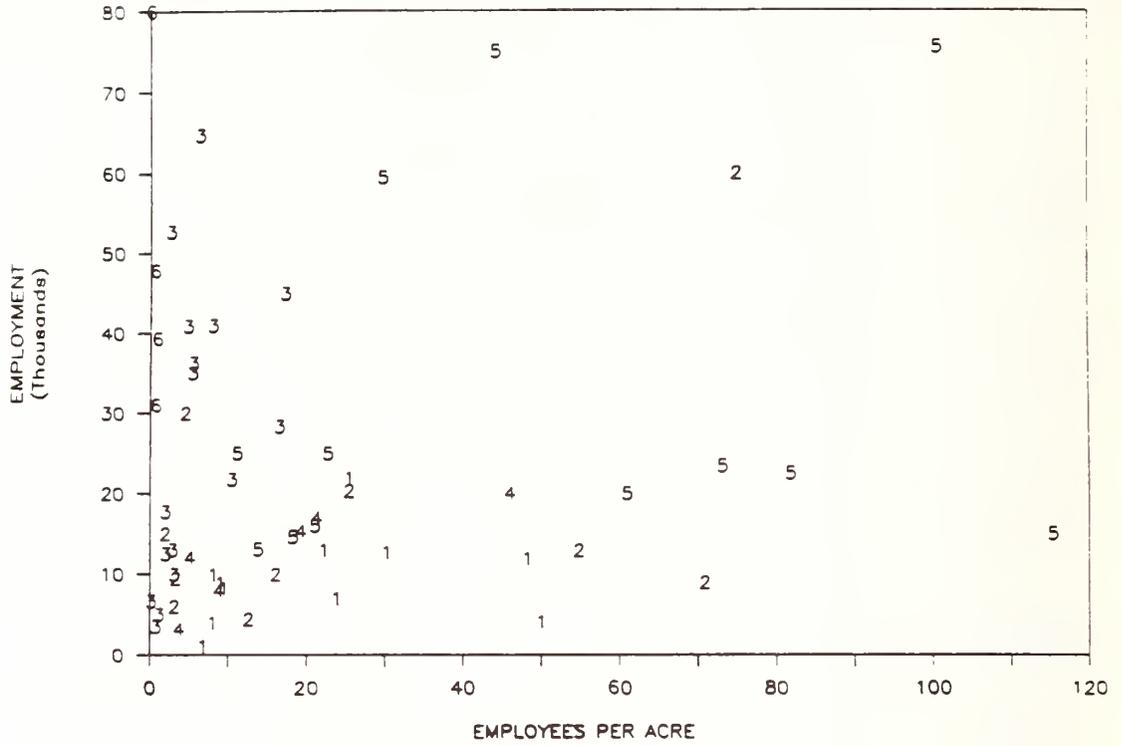
In the accompanying scatter-plot in Figure 3-3, large corridors (#6) are clustered along the y-axis, due to their low densities; megacenters (#5) are spread above the x-axis in two groups, one of low employment and one high. In Figure 3-4 where acreage is used instead as an indicator of size, it becomes even more clear how the large corridor group differs from the rest of the SACs. It should be noted that six outliers all large corridor centers have been omitted from the plot.

All SAC types were found to differ significantly from CBDs in their employment density at confidence levels of virtually 100 percent.

Table 3-5 Density Characteristics of SACs

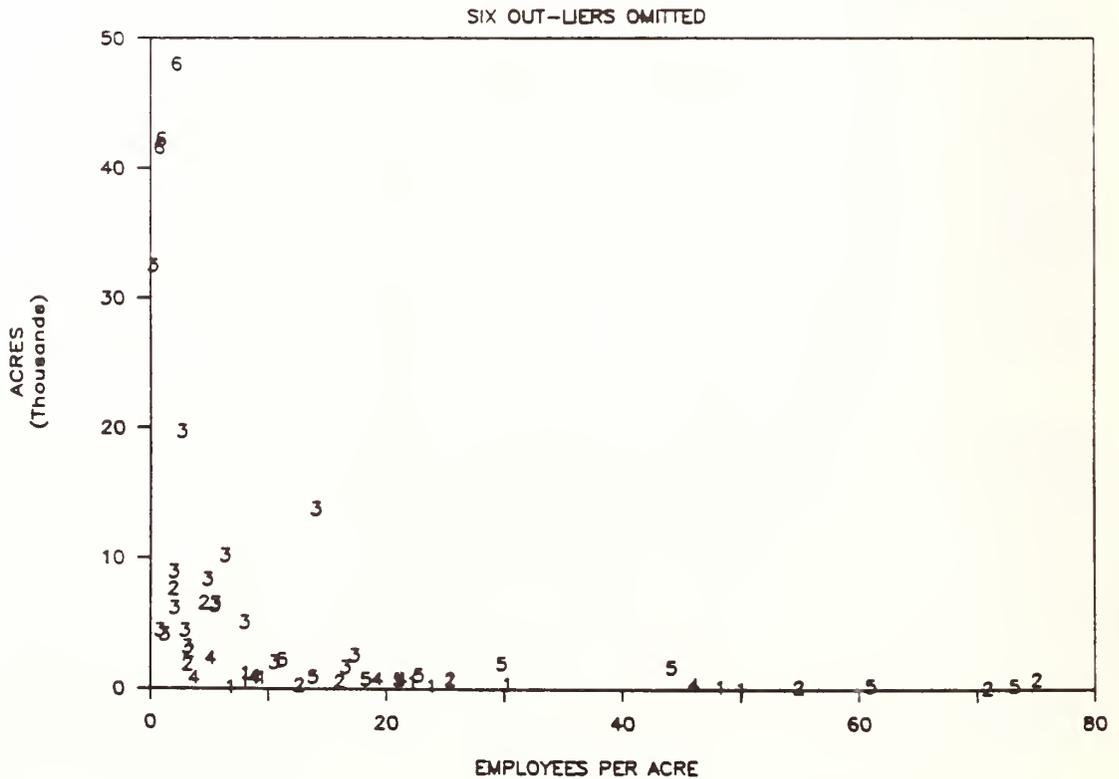
<i>Employees Per Acre</i>	Mean	Std Dev	Min	Max	Median	No. of Cases
Office Park	21.92	15.82	6.79	50.00	22.22	11
Office Center	26.76	29.06	1.95	75.00	14.29	10
Large MXD	6.08	5.44	0.20	17.31	4.87	17
Moderate MXD	17.34	15.80	3.70	45.98	14.01	6
Megacenter	49.40	36.13	11.16	115.38	36.93	12
Large Corridor	0.95	0.70	0.10	2.18	0.84	6
SAC Total	21.20	26.39	0.10	115.38	9.95	62
CBD	175.86	101.91	38.00	415.09	154.69	20
<i>Percent of Area Covered by Bldg.</i>	Mean	Std Dev	Min	Max	Median	No. of Cases
Office Park	28.9	10.51	16.00	50.00	27.00	10
Office Center	43.67	27.95	10.00	90.00	35.00	9
Large MXD	38.50	9.94	25.00	55.00	35.00	16
Moderate MXD	28.00	8.74	14.00	38.00	27.50	6
Megacenter	43.49	21.13	11.90	75.00	37.50	10
Large Corridor	29.50	2.12	28.00	31.00	29.50	2
SAC Total	36.98	17.12	10.00	90.00	33.00	53
CBD	59.00	16.41	35.00	80.00	55.50	6

Figure 3-3. Scatter Plot of Employment Density versus Employment



Note: 1 = Office Park, 2 = Office Center, 3 = Large MXD, 4 = Moderate MXD, 5 = Megacenters, 6 = Large Corridor

Figure 3-4. Scatter Plot of Employment Density versus Acreage



Percent of Area Covered by Buildings - A clearly visible factor that differentiates most CBDs from SACs is the level of coverage of land by buildings. In downtown areas, typically more than half of all land area is covered by buildings. In contrast, almost all SACs have coverage ratios significantly less than 50 percent. The most built-up SACs are megacenters and office centers, both of which average just under 44 percent coverage. Interestingly, office centers account for both the lowest and the highest coverage ratios among all areas studied, including CBDs. Only ten percent of the land area in the I77/Rockside Corridor is covered by buildings, while the coverage ratio in Central Walnut Creek has hit 90 percent. Large MXDs average about 38 percent coverage with values as high as 55 percent (both Plantation and Oak Brook/I-88 Tollway). Moderate MXDs and office parks have comparable measures, averaging around 28 percent coverage. Office parks have a greater variability, however, ranging as high as 50 percent (Mainland Center, Florida). Only two data points were available on this measure for large corridors; their mean is 29.5 percent.

Land Use Mix Characteristics

Table 3-6 presents a statistical analysis of survey data relating to two frequent land uses in SACs and CBDs: office space and housing. Data on retail, industrial and other land uses were not deemed reliable in a sufficient number of cases to permit meaningful analysis.

Office Space as Percent of Total Floor Space - Predictably, office centers and office parks have the highest average ratios of office space to total floor space. The mean for office centers is 90 percent and the range is quite narrow, from 80 percent in Central Ft. Lauderdale to 100 percent in Maryland's Rock Spring Park. Office parks, while ranging up to 99 percent office space (3M Business Park-Minnesota), have a low end of 60 percent (Inverness Business Park). This difference is because office parks have a greater tendency than office centers to include some component of light manufacturing, warehousing or retail space. megacenters average around 60 percent office space, but range as high as 74 percent (Uptown Houston). Large corridors and moderate MXDs have comparable means of around 41 percent, but the median moderate MXD is 40 percent office, versus 30 percent for the median large corridor. The mean for large corridors is skewed by the Silicon Valley Golden Triangle, in which 74 percent of all floor space is reported to be office space.

The ratio for CBDs is most like that for megacenters; the mean is 64 percent office space and the median is 65 percent, but the range of values is broader. The lowest ratio among CBDs is 25.75 percent reported in Portland. The greatest CBD office space ratio is in Orlando (90.8 percent).

In the accompanying scatter-plot in Figure 3-5 relating employment to the percent of office space. Office parks and centers (#s 1 and 2) are all in the lower right quadrant, while large MXDs and moderate MXDs (#s 3 and 4) cluster in the left part of the plot. Megacenters (#5) are clustered in the middle portion of the plot.

Table 3-6. Land Use Mix Characteristics

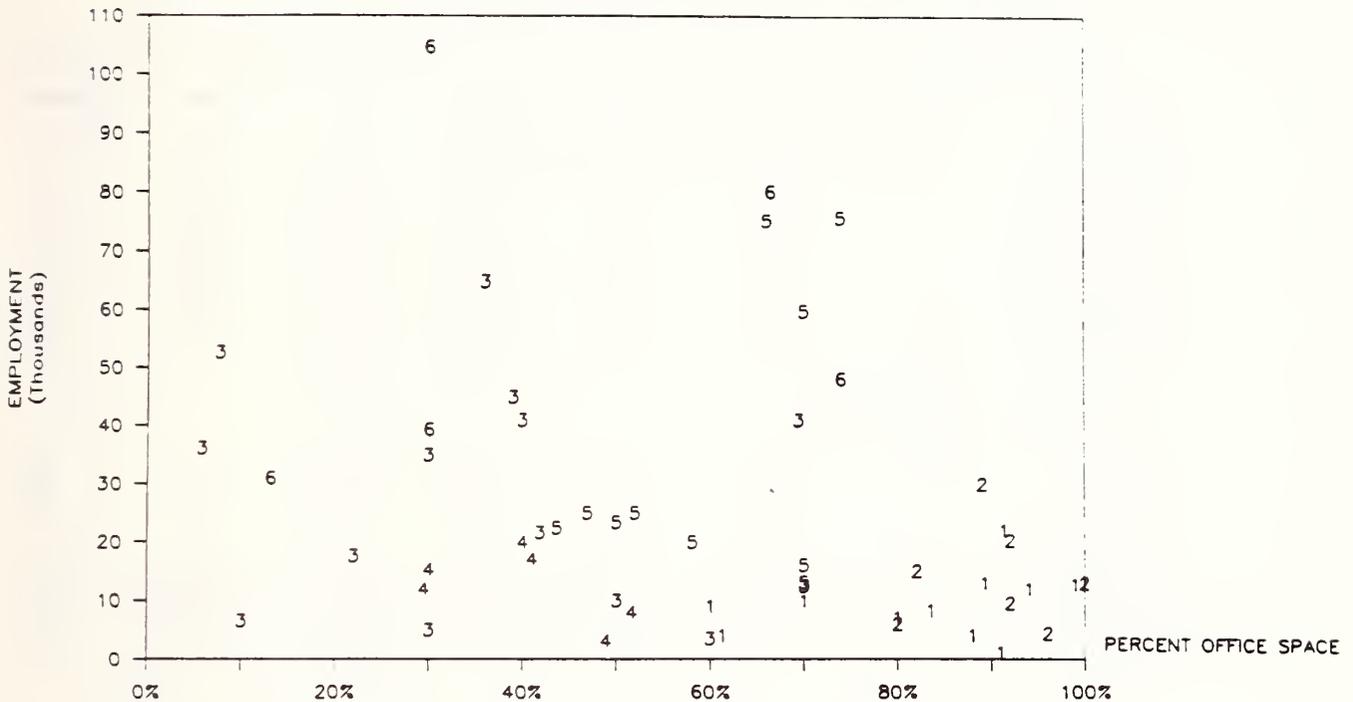
<i>Office Space as Percent of Total Floorspace</i>	Mean	Std Dev	Min	Max	Median	No. of Cases
Office Park	82.72	13.43	60.00	99.00	88.00	11
Office Center	90.14	7.17	80.00	100.00	92.00	7
Large MXD	36.56	21.05	5.80	70.00	37.50	14
Moderate MXD	40.16	9.22	29.46	51.61	40.50	6
Megacenter	60.07	11.24	43.67	73.97	62.04	10
Large Corridor	42.70	26.19	13.06	74.00	30.00	5
SAC Total	58.64	26.19	5.80	100.00	60.00	62
CBD	64.20	16.44	25.75	90.80	63.31	20
<i>No. of Housing Units in Area</i>	Mean	Std Dev	Min	Max	Median	No. of Cases
Office Park	11	33	0	105	0	10
Office Center	270	362	0	1,100	200	9
Large MXD	8,431	16,934	0	65,760	3,762	14
Moderate MXD	771	1,284	0	3,200	94	6
Megacenter	2,538	2,060	160	5,600	2,500	9
Large Corridor	35,968	20,676	22,565	59,780	25,558	3
SAC Total	5,018	12,869	0	65,760	302	51
CBD	10,990	18,113	260	61,000	4,131	12

An analysis of variance found that, on this variable, office parks and office centers tend toward similarity. Megacenters and CBDs also have significantly similar office space ratios, as do large corridors, large MXDs and moderate MXDs. These three groupings were found to differ from each other at confidence levels in excess of 99 percent.

Number of Housing Units in Area - All megacenters, large corridors and CBDs for which data were developed include some housing. The center with the least housing is the Denver Technological Center, which has 160 housing units. Because large corridors, by virtue of their sheer size, usually contain a cross-section of regional land uses, most of them have an abundance of housing. The smallest component of housing among the large corridors is 22,545 units in the Massachusetts Route 495 Corridor. Among CBDs, Dallas is the smallest with only 260 units. The highest number of housing units within a CBD is found in Chicago (61,000). Although large MXDs have a median housing count of 3,762, California's LAX Corridor has the most housing units of any SAC (65,760).

Statistically significant differences (over 99 percent confidence) were found between the housing counts of large corridors and those of office parks, office centers and moderate MXDs. Somewhat weaker differences appear between the large corridors and the housing counts of megacenters and large MXDs (98.3 percent and 93.5 percent confidence, respectively).

Figure 3-5. Scatter Plot of Percent of Office Space versus Employment



Note: 1 = Office Park, 2 = Office Center, 3 = Large MXD, 4 = Moderate MXD, 5 = Megacenter, 6 = Large Corridor

Travel Characteristics

Table 3-7 presents a summary of statistics which measure quantifiable travel characteristics of SACs. These include average commuting times and distances, as well as the percentages of commuters ride-sharing, using transit, and driving alone.

Commuting Time and Distance - By all measures, average commuting times and distances to CBDs are markedly longer than the average times and distances to SACs. Greater proportions of regional populations live in suburban areas than live in or near CBDs. The minimum average CBD commuting time of 23 minutes (Detroit) is at least three minutes longer than the minimum average times reported for SACs (20 minutes reported for several office parks, large corridors and moderate MXDs). The maximum average CBD commuting time of 40 minutes (Philadelphia) is 25 percent longer than the maximum average SAC commuting time of 32 minutes (Mainland Center, an office park). Median times reflect similar overall differences, although megacenters, with a median average commuting time of 28 minutes come within 3.5 minutes of the CBD median.

A Scheffe test for groups with significant differences identified the differences in commuting times between CBDs and two types of SAC (office centers and large MXDs) to be significant above the 98 percent confidence level. No significant differences were found in commuting distances.

Table 3-7. Travel Characteristics

<i>Average Commuting Time in Minutes</i>	Mean	Std Dev	Min	Max	Median	No. of Cases
Office Park	24.8	4.6	20.0	32.0	24.0	11
Office Center	21.4	6.9	10.0	31.0	22.0	10
Large MXD	23.8	5.0	14.0	31.0	23.5	16
Moderate MXD	24.2	3.3	20.0	27.0	25.5	6
Megacenter	26.4	4.2	18.0	31.0	28.0	11
Large Corridor	24.0	4.5	20.0	30.0	22.5	6
SAC Totals	24.1	5.0	10.0	32.0	25.0	60
CBD	31.8	5.2	23.0	40.0	32.5	12
<i>Average Commuting Distance (Miles)</i>						
Office Park	12.2	4.5	6.0	20.0	12.0	11
Office Center	10.5	2.1	8.0	15.0	10.0	10
Large MXD	10.7	4.7	6.0	25.0	9.8	15
Moderate MXD	11.8	2.2	10.0	15.0	11.0	6
Megacenter	10.1	3.1	7.0	15.0	9.5	10
Large Corridor	11.0	2.0	10.0	15.0	10.0	6
SAC Totals	11.0	3.5	6.0	25.0	10.0	58
CBD	11.6	3.6	7.0	18.0	10.0	11
<i>Pct. of Commuters Driving Alone</i>						
Office Park	77.8	5.6	70.0	87.0	78.0	11
Office Center	74.3	7.8	63.0	90.0	73.3	10
Large MXD	73.3	4.7	66.0	79.0	73.6	16
Moderate MXD	78.8	9.2	68.0	95.0	77.5	6
Megacenter	71.3	7.2	58.2	80.0	73.0	11
Large Corridor	73.0	5.2	66.0	82.0	72.0	6
SAC Totals	74.4	6.7	58.2	95.0	74.0	60
CBD	62.2	20.9	19.0	88.0	63.3	10
<i>Pct. of Commuters Ride-Sharing</i>						
Office Park	11.9	9.7	3.0	34.0	8.0	11
Office Center	12.5	6.8	6.0	25.4	10.5	10
Large MXD	16.7	7.2	5.0	28.0	17.5	16
Moderate MXD	13.0	8.8	4.0	26.0	11.0	5
Megacenter	13.8	5.9	5.0	23.0	12.0	11
Large Corridor	15.5	6.3	7.0	22.0	18.5	5
SAC Totals	14.1	7.4	3.0	34.0	12.5	58
CBD	18.2	12.3	0.5	48.7	16.9	17
<i>Pct. of Commuters Using Transit</i>						
Office Park	2.5	2.7	1.0	9.0	2.0	8
Office Center	2.1	0.9	0.5	4.0	2.0	9
Large MXD	3.0	2.5	0.2	9.0	2.0	15
Moderate MXD	2.0	0.6	1.0	3.0	2.0	6
Megacenter	4.7	2.8	1.0	10.0	4.5	10
Large Corridor	3.6	3.5	0.7	8.5	2.0	5
SAC Totals	3.0	2.4	0.2	10.0	2.0	53
CBD	29.9	19.2	5.0	82.5	28.8	18

Office parks and moderate MXDs report the highest average commuting distances at 12.2 and 11.8 miles, respectively. However, the rough calculations in Table 3-8 below suggest that these types of centers also have the highest average commuting speeds.

Table 3-8. Average Commuting Speed
(avg. miles/avg. time = miles per hour)

Office Park	29.5
Office Center	29.4
Large MXD	27.0
Moderate MXD	29.4
Megacenter	23.0
Large Corridor	27.5
CBD	21.9

Mode Choice - Regardless of whether they work in CBDs or SACs, most commuters drive to work alone. While just over 62 percent of commuters to surveyed CBDs drive alone, well in excess of 70 percent of SAC commuters make the trip between home and work in a single-occupant vehicle.

The differences in transportation mode characteristics of suburban versus downtown workers are among the most striking of any contrasts found in this study. Downtown commuters tend to use ride sharing slightly more than suburban commuters do, although large corridors and office centers have higher medians of usage; but the differences in transit usage are quite large. SACs on average report that only between two and five percent of their commuters use transit. Meanwhile, an average of almost 30 percent of CBD commuters are using transit. The range is from a low of five percent in the Los Angeles CBD to 82.5 percent in Lower Manhattan. SACs, on the other hand, have a much narrower range of transit usage: a low of 0.20 percent is reported for West Houston, a large MXD, while the greatest proportion reported was only 10 percent in Las Colinas, a Dallas megacenter. The confidence levels for the differences between the use of transit by CBD and SAC commuters are 99.91 percent for large corridors and 100 percent for all other SAC types.

Mobility Problems

From a large set of verbal responses, Rice Center researchers have distilled three essential categories of traffic or transportation problems reported in SACs and CBDs. A tabulation of these problem categories is presented in Table 3-9.

Congestion within center - Most SACs and CBDs reported some type of traffic or transportation problem. Only one CBD and five SACs purport to have no mobility problems at this time. Of the SACs which do report problems, the most frequently cited are those involving intra-center traffic congestion or congestion due to traffic passing through the center to another destination. Forty-two percent of SACs surveyed have these types of problems, led by moderate and large MXDs (66.7 and 61.1 percent, respectively).

Table 3-9. Mobility Problems

Type of Center	Congestion Within Center		Congestion on Routes To and From Center		Other Congestion Problems	
	No.	%	No.	%	No.	%
Office Park	2	18.2	4	36.4	3	27.3
Office Center	4	36.4	5	45.5	3	27.3
Large MXD	11	61.1	7	38.9	3	16.7
Moderate MXD	4	66.7	2	33.3	1	16.7
Megacenter	4	33.3	4	33.3	3	25.0
Large Corridor	2	33.3	1	16.7	0	0.0
SAC Totals	27	42.2	23	35.9	13	20.3
CBD	12	57.1	9	42.9	11	52.4

Congestion on Routes To and From Center - Traffic Congestion on most or all routes leading to the center or on particular commuter routes leading to the center is a problem in 36 percent of SACs and 43 percent of CBDs. Office centers cite these problems most frequently (45.5 percent).

Other Congestion Problems - Poor pedestrian mobility, lack of mass transit, and other miscellaneous problems are reported most frequently in CBDs (52.4 percent), whereas only 13 of 74 SACs (20.3 percent) report any of these problems. This is interesting since CBD's have more transit and pedestrian facilities than SACs.

Concerns About Congestion

Existing Congestion: Respondents were also queried as to the extent to which they believed the public-sector and/or the private-sector was concerned about current and anticipated levels of congestion. The level of concern about existing levels of congestion is most often rated very high (five on a one-to-five scale). Overall, 41 percent of respondents say that private sector concern was very high, while 51 percent say that public sector concern was very high. Private sector concerns are highest in large corridors and large MXDs. Respectively, 83 and 59 percent of respondents from these SAC types say that the private sector is very concerned about existing levels of congestion. Only three respondents say that the private sector is not concerned about existing congestion, one each representing office parks, office centers and moderate MXDs. All respondents representing CBDs say that public-sector concerns rate at least a three on the scale.

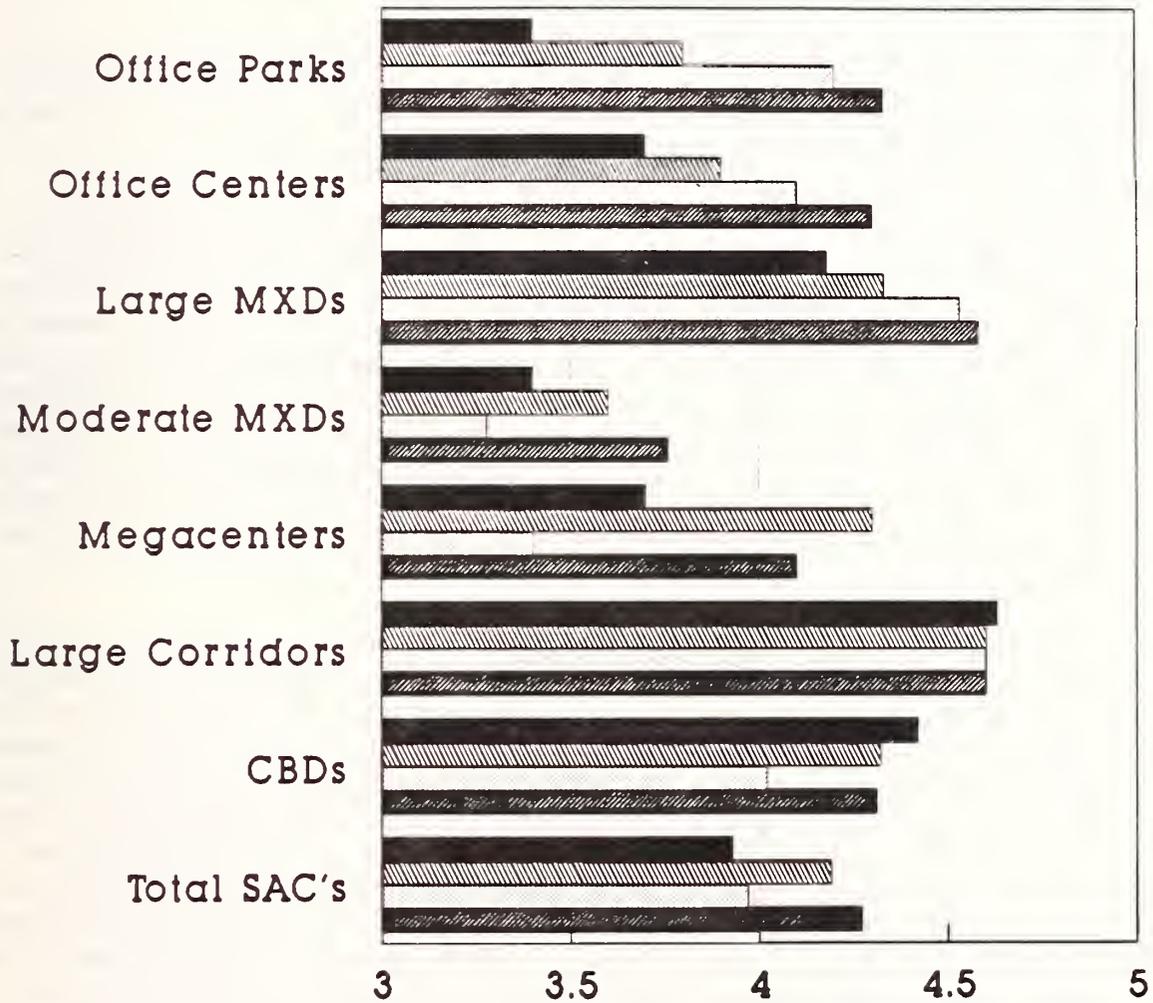
In general, public-sector concerns tend to be higher than those of the private sector. The highest levels of public-sector concern about existing congestion are reported by large MXDs (75 percent), and large corridors (80 percent). Public-sector concern in CBDs, however, ranks slightly lower than does private-sector concern. Figure 3-6 presents the results of public and private sector concerns about existing and anticipated congestion using a weighted average scores from a 5-point scale ranging from 1 = not concerned to 5 = very concerned.

Figure 3-6. Concerns about Congestion

Concerns about Congestion

Private vs Public
Existing vs Anticipated

Type of Center



Level of Concern



Anticipated Congestion: Generally, concerns about anticipated levels of congestion run higher in both the public and private sectors than for existing congestion. Moderate MXDs and megacenters had the smallest portion of respondents with the highest and next highest public concern levels. Only in megacenters private concerns about anticipated congestion was higher than public concerns. In office parks, office centers, large and moderate MXDs public concerns exceeded those of the private sector. Large corridors had consistently the highest concern about congestion.

Transportation Actions

Rice Center developed five major data series relating to transportation facilities in and servicing SACs and CBDs. The ratio of parking spaces to square feet of floor space is analyzed, also researched for this section was whether or not an area had transit services, roadway improvements, and transportation management actions.

Parking - The ratio of parking spaces to floor space among the SACs and CBDs is in inverse proportion to the usage of transit by commuters. CBDs clearly have much less parking than SACs, averaging 1.3 spaces per 1,000 square feet of floor space versus an average range of from 3.0 to 4.2 spaces per 1,000 square feet in SACs. Large corridors and megacenters, which have the lower ratios among SACs, also have higher average levels of transit usage among their commuters. The highest average SAC ratio (4.2) is in moderate MXDs, which have the lowest average usages of transit and ride sharing and the highest percentage of commuters driving alone (see Table 3-10). All SAC types differ significantly from CBDs on this variable. With the exception of large corridors, the confidence level of these differences is virtually 100 percent. The confidence level for large corridors is 94 percent.

Types of Bus Service - Two basic types of bus service are reported among the remaining 39 SACs and 15 CBDs from which responses were received: residential connectors and rail station connectors. About the same proportions of CBDs and SACs (60 percent) have residential connectors. All office centers have residential bus service. Table 3-11 presents different types of transit services. About the same proportions of CBDs (60 percent), and SACs have residential connectors. All office centers have residential bus service. Table 3-11 presents the results on the availability of different types of transit service. In areas where one, but not the other, type of bus service is available residential connectors are reported twice as frequently as rail station connectors in SACs. For CBDs, the imbalance is nine to one. Five CBDs report both types of bus service, while four SACs have both types. About the same proportions of CBDs and SACs have rail station connectors, but more CBDs have both types of bus service. Fairlane Town center, a moderate MXD suburb of Detroit, Michigan, is the only area among the 85 studied that is reported to have no bus service whatsoever. This area, also reports no bike paths, no rail service, and no shuttle service and not surprisingly, is an automobile manufacturing center.

Shuttle Bus Service - More CBDs also have shuttle service than SACs. Megacenters and office parks, which report very low frequencies of rail service, have fairly high shuttle service figures. Overall, shuttle service is reported for 39 percent of the SACs surveyed, but the sample size for this variable is only 49, compared to 60 or more on most other

variables. Overall, 83 percent of CBDs are reported as having shuttle services.

Passenger Rail Service - Of 62 SACs surveyed, 16, or 25.6 percent have some form of passenger rail service. The highest proportions were among large corridors and large MXDs half of the centers of these types have rail service. Among other SACs, the ratios of rail service are much lower with only three of 11 office centers, one of 11 megacenters, and no office parks or moderate MXDs benefitting from passenger rail. CBDs are much more likely to have rail service than SACs. Of 19 CBDs, 13, or 68.4 percent have rail service.

Table 3-10. Parking
(Spaces per 1,000 Square Feet)

Parking per 1,000 Sq.Ft.						No. of Cases
	Mean	Std Dev	Min	Max	Median	
Office Park	3.9	0.8	2.0	5.0	4.0	11
Office Center	3.5	0.6	2.1	4.6	3.5	10
Large MXD	4.0	0.9	2.7	5.7	3.8	16
Moderate MXD	4.2	0.5	3.5	5.0	4.1	6
Megacenter	3.4	0.4	2.6	4.0	3.4	10
Large Corridor	3.0	1.9	0.3	4.5	3.7	4
SAC Total	3.7	0.9	0.3	5.7	3.7	57
CBD	1.3	0.5	0.8	2.4	1.0	9

Table 3-11. Transit Service

Type of Center	Residential Bus Service		Shuttle Bus Services		Passenger Rail		Employer Transit Subsidies		Other Encouragements To Transit Use	
	No.	%	No.	%	No.	%	No.	%	No.	%
1. Office Park	3	50.0	3	27.3	0	0.0	1	10.0	5	50.0
2. Office Center	6	100.0	2	25.0	3	27.3	5	45.5	6	60.0
3. Large MXD	9	64.3	4	36.4	9	50.0	6	35.3	11	68.8
4. Moderate MXD	1	20.0	3	50.0	0	0.0	0	0.0	2	33.3
5. Megacenter	4	57.1	6	54.5	1	9.1	4	33.3	5	55.6
6. Large Corridor	0	0.0	1	50.0	3	50.0	3	50.0	5	83.3
7. SAC Totals	23	59.0	19	40.4	16	28.6	19	31.1	34	59.6
8. CBD	9	60.0	15	83.3	13	68.4	14	82.4	11	78.6

Employer Transit Subsidies - About a third of SACs reported to have some employers offering a transit subsidy program (free or reduced cost passes, etc.). More than 80 percent of CBDs have such a subsidy program.

Other Encouragements to Transit Use - To the question: "Does your area have improvements other than direct impacts on transportation conditions, including communi-

cations and consciousness-raising or other special programs or policies which encourage transit usage, and especially private actions" almost 60 percent of the SACs responded positively versus 79 percent of CBDs. The large corridor group had the highest response rate, at 83 percent.

Traffic Circulation Improvements - Megacenters are more likely to have had traffic circulation improvements, such as diverting truck traffic than any other type of center includes CBDs.

Roadway Improvements - The mechanisms most frequently cited to address area problems is roadway improvements to. Fifteen of 17 CBDs responding (88.2 percent) and 52 of 62 SACs (87.1 percent) are undergoing roadway improvements. The highest positive response rate on this variable is from megacenters (100 percent). Table 3-12 presents the tabulation of traffic circulation and roadway improvements.

Transportation Demand Management - Table 3-13 presents the results of three types of demand management strategies designed to reduce congestion. They include having a rideshare coordinator in the area, a parking reduction policy, and a trip reduction ordinance. Having a rideshare coordinator is the most popular strategy. About 56 percent of the SACs have such a coordinator, versus 73 percent of the CBDs. In contrast, 70 percent of megacenters and office centers have a rideshare coordinator.

**Table 3-12. Transportation Improvements
(Roadways)**

Type of Center	Traffic Circulation Improvements		Roadway Improvements	
	No.	%	No.	%
Office Park	2	22.2	9	90.0
Office Center	5	45.5	10	90.9
Large MXD	6	37.5	14	82.4
Moderate MXD	1	16.7	5	83.3
Megacenter	8	80.0	12	100.0
Large Corridor	3	50.0	4	66.7
SAC Totals	25	43.1	54	87.1
CBD	12	66.7	15	88.2

Table 3-13. Transportation Demand Management

Type of Center	Ride Coordinator		Parking Reduction		Trip Reduction Ordinance	
	No.	%	No.	%	No.	%
Office Park	5	45.5	0	0.0	2	20.0
Office Center	7	70.0	4	36.4	2	18.2
Large MXD	9	56.3	4	23.5	1	6.3
Moderate MXD	3	50.0	0	0.0	1	16.7
Megacenter	7	70.0	4	36.4	2	16.7
Large Corridor	2	33.3	1	16.7	1	16.7
SAC Totals	33	55.9	13	21.3	9	14.8
CBD	11	73.3	7	38.9	1	5.6

Bike Path - Thirty-three percent of a rather small (15) sample of CBDs are reported to have bike paths. Nearly 30 percent of SACs have bike paths. The largest proportions are among office parks and large MXDs, both over 40 percent. The other SAC types are clustered in a range of 16 to 20 percent on this variable.

Business and Government Actions

Table 3-14 summarizes, by center type, actions being taken by the business community and the government sector to alleviate traffic congestion and improve area mobility.

Business Actions - The two most frequently cited actions by the business communities of the study areas relate to our discussion of organizational mechanisms. The most popular action for the business community is to form a TMA or other such group, or, if such a group already exists, to cooperate with it. The second most frequently cited action of the business community is to conduct studies of their area's situation or to begin planning solutions to problems already identified. Third on the list are roadway or highway construction, signalization, and interchange improvements. These types of physical improvements, along with the formation of or cooperation with TMAs, are the favored actions among businesses in SACs and are rare (one case in 21) in CBDs. The favored actions in CBD business communities are general bus transit improvements and connection to/creation of a mass transit system (29 percent).

About 24 percent of CBDs and 11 percent of SACs are implementing auto-use reduction policies (such as parking restrictions or increased fees) or are benefitting from employer actions aimed at reducing congestion (flextime, employer-sponsored vanpools, or transit subsidies). A cross-tab analysis reveals that these types of actions are strongly related to the existence of TMAs but not to Employer Associations.

Government Actions - Reported government actions generally follow the same trend as business actions. Formation of or cooperation with a TMA is the most common government action reported in SACs, followed by studies and planning, and roadway construction programs. CBDs report higher levels of government activity on a number of variables, but the leaders are bus transit improvements and connection to/creation of a rapid transit system, roadway construction, and studies and planning.

Table 3-14. Business and Government Actions

Business Actions

Type of Center	Conducting Planning Studies		TMA or Other Group		TDM Actions		Ridesharing		Roadway & TSM Improvements		Bus Transit Improvements	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Office Park	2	18.2	4	36.4	1	9.1	1	9.1	4	36.4	0	0.0
Office Center	1	9.1	3	27.3	2	18.2	2	18.2	3	27.3	1	9.1
Large MXD	8	44.4	3	16.7	1	5.6	4	22.2	5	27.8	1	5.6
Moderate MXD	1	16.7	1	16.7	0	0.0	0	0.0	2	33.3	2	33.3
Megacenter	2	16.7	6	50.0	2	16.7	2	16.7	3	25.0	3	25.0
Large Corridor	0	0.0	2	33.3	1	16.7	1	16.7	0	0.0	0	0.0
SAC Totals	14	21.9	19	29.7	7	10.9	10	15.6	17	26.6	7	10.9
CBD	5	23.8	1	4.8	5	23.8	1	4.8	1	4.8	6	28.6

Government Actions

Type of Center	Conducting Planning Studies		TMA or Other Group		TDM Actions		Ridesharing		Roadway & TSM Improvements		Bus Transit Improvements	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Office Park	1	9.1	4	36.4	1	9.1	2	18.2	1	9.1	0	0.0
Office Center	2	18.2	3	27.3	4	36.4	2	18.2	1	9.1	3	27.3
Large MXD	8	44.4	5	27.8	1	5.6	2	11.1	7	38.9	2	11.1
Moderate MXD	1	16.7	2	33.3	0	0.0	1	16.7	2	33.3	1	16.7
Megacenter	4	33.3	4	33.3	2	16.7	1	8.3	2	16.7	3	25.0
Large Corridor	1	16.7	2	33.3	1	16.7	1	16.7	1	16.7	0	0.0
SAC Totals	17	26.6	20	31.3	9	14.1	9	14.1	14	21.9	9	14.1
CBD	6	28.6	2	9.5	1	4.8	5	23.8	7	33.3	9	42.9

Interest in Alternative Transportation - Both the public and private sectors are interested in alternatives to major roadways and parking investments. Public sector interest in alternatives tends to be higher overall than private sector interest. Overall, 28 percent of respondents rate interest to be very strong, 24 percent rate it somewhat strong, 22 percent rate it moderate and 22 percent rate it somewhat weak. Respondents in megacenters have the highest overall interest in alternatives. Ninety percent of megacenters fall into the two highest categories of interest, while 92 percent of moderate MXDs give responses in the three lowest categories. Among large corridors there is a split: 60 percent report very high interest in alternatives, but the remaining 40 percent is in the second-to-lowest category. Figure 3-7 presents the results of the private and public sector interest in transportation alternatives, as well as the private sector desire for lobbying using a weighted average from a 5-point scale ranging from 1 = no interest, to 5 = very interested.

Lobbying for Area Needs - Private sector desire for an organization to lobby for area needs is highest among large corridors, megacenters and large MXDs. At least 64 percent of these SAC types rate their levels of desire in the two highest categories. The lowest levels of desire are in moderate MXDs. Respondents representing CBDs reported the broadest range of desire levels with 21 percent saying there is no desire, 36 percent saying there is strong desire, and the rest evenly distributed in between. Figure 3-7 presents three variables private and public interest in alternative transportation and private desire in lobbying for area transportation needs.

Organizational Mechanisms

Table 3-15 contains two variables relating to the types of organizational mechanisms which have been instituted in SACs or CBDs in order to reduce traffic congestion, improve the flow of traffic, or otherwise improve overall mobility.

Employer Associations - The formation of employer associations is reported in 15 of 18 CBDs (83.3 percent), but only in about 60 percent of SACs. Megacenters have an equal frequency of associations as CBDs.

Transportation Management Associations - Transportation Management Associations (TMAs) are in use in 40 percent of CBDs and 35 percent of SACs. Although employer associations may have other functions, in the context of this study TMAs and employer associations both serve as planners, organizers and motivators toward the orderly development of ways and means to improve mobility within their areas of influence. There is some overlap between these organizations and their functions, but there appear to be enough differences that some areas, particularly CBDs, have both an employer association and a TMA. This characteristic is shared by megacenters with 70 percent having TMAs and 83 percent having employer associations, which are both the highest figures among SACs. moderate and large MXDs have the lowest rates of formation of both TMAs and employer associations.

Figure 3-7. Interest in Transportation

Interest in Transportation

Alternative Modes & Lobbying Private vs Public

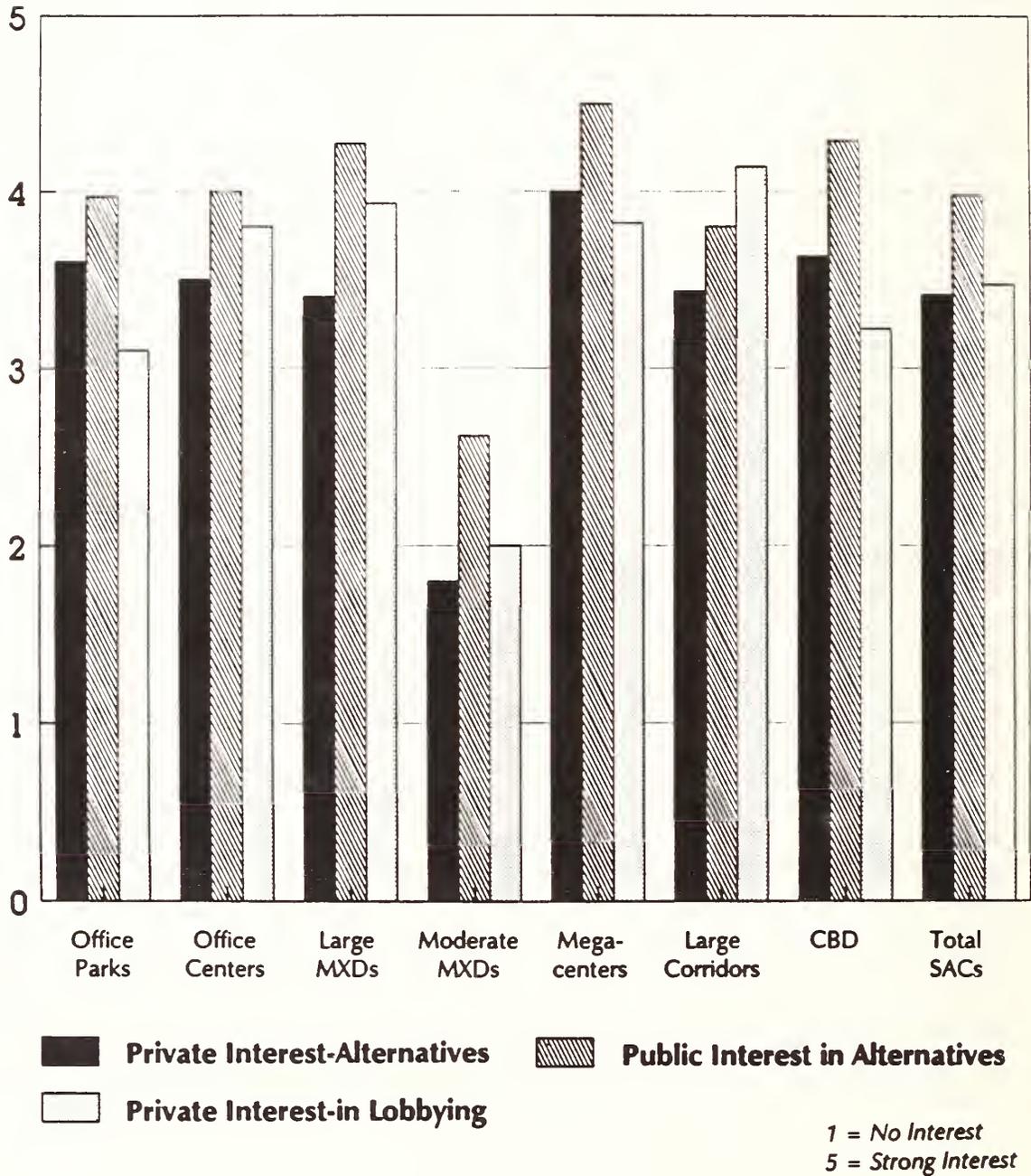


Table 3-15. Organizational Mechanisms

Type of Center	Employer Associations		Transportation Management Associations	
	No.	%	No.	%
1. Office Park	6	66.7	3	27.3
2. Office Center	6	54.5	5	50.0
3. Large MXD	8	47.1	3	18.8
4. Moderate MXD	3	50.0	1	16.7
5. Megacenter	10	83.3	7	70.0
6. Large Corridor	4	66.7	2	33.3
7. SAC Totals	37	60.7	21	35.6
8. CBD	15	83.3	6	40.0

Relations Between Organizational Structures and other variables

First relations between employer associations and TMAs with center characteristics will be examined and relations with transportation actions will be discussed subsequently.

Relations with Employment Density - A cross-tab analysis reveals a strong relationship between employment density within an area and the existence of TMAs or employer associations; the relationship between employer associations and employment density is somewhat stronger statistically. Among areas with more than 15 employees per acre, 82 percent have TMAs and 82 percent have employer associations. Within areas that have employment densities at or below 15 employees per acre, 75 percent do not have TMAs and 56 percent do not have employer associations (see Table 3-16).

As mentioned previously, TMAs and employer associations overlap somewhat in their functions, but they are not equivalents. Employer associations may or may not have to be precursors to, or requisites for, the development of TMAs. Of 72 areas reporting information on the existence of TMAs or employer associations, only eight areas with TMAs had no employer associations. In contrast, 23 areas with TMAs also have employer associations.

Relations with Transportation Demand Management Actions - Cross-tabulation analyses suggest moderate-to-strong relationships between the existence of these groups and the implementation of mechanisms of direct benefit to their areas. Table 3-17 shows that transit subsidies are strongly related to employer associations (27 of 33 cases, or 82 percent). There is a moderately strong relationship between employer transit subsidies and TMAs, but some of that is due to overlap with employer associations. Trip reduction ordinances are very strongly related to TMAs (Table 3-18), but not to employer associations.

Table 3-16. Cross Tabulation of Employment Density and Employer Associations

Employees/Acre Density Range	Without Employer Association	With Employer Association	Total
Less than 5	10	9	19
Total %	13.0	11.7	24.7
Row %	52.6	47.4	
Column %	37.0	18.0	
5 to 15	9	6	15
Total %	11.7	7.8	19.5
Row %	60.0	40.0	
Column %	33.3	12.0	
16 to 50	5	13	18
Total %	6.5	16.9	23.4
Row %	27.8	72.2	
Column %	18.5	26.0	
More than 50	3	22	25
Total %	3.9	28.6	32.5
Row %	12.0	88.0	
Column %	11.1	44.0	
Total	27	50	77
Percent	35.1	64.9	100.0

Chi Square = 12.9319 DF = 3 Prob = 0.0048

Relations with Roadway Improvements - The most pronounced relationship which emerges from the cross-tabulation analysis of employer associations and TMAs with other services and programs is the positive relationship between TMAs and area circulation improvements. Seventy-three percent of areas with TMAs have made traffic circulation improvements. On the other hand, 70 percent of areas without TMAs do not report any such improvements. There is at best a very weak statistical relationship between employer associations and circulation improvements, suggesting that the particular types of expertise found in TMAs are required to plan and execute highly technical changes to an area's traffic management equipment and procedures. Road improvements, in contrast to circulation improvements, generally involve the repair or enhancement of existing thoroughfares. Roadway improvements are strongly correlated with employer associations and not with TMAs. Seventy percent of areas with roadway improvements have employer associations, and 70 percent of areas without such improvements do not have employer associations. Tables 3-19 and 3-20 present the two cross tabulations.

Table 3-17. Cross Tabulation of Employer Associations and the Employer Transit Subsidy Program

Transit Subsidy	Employer Association		Total
	Without Assoc	With Assoc	
Without Subsidy	20	24	44
Total %	26.0	31.2	57.1
Row %	45.5	54.5	
Column %	76.9	47.1	
Areas With Subsidy	6	27	33
Total %	7.8	35.1	42.9
Row %	18.2	81.8	
Column %	23.1	52.9	
Total	26	51	77
Percent	33.8	66.2	100.0

Fishers Exact Test

Observed Sample Taken Alone $P = 0.00840$

One Tailed

$P = 0.01088$

Two Tailed

$P = 0.01540$

Chi Square = 5.11132 DF = 1 Prob = 0.0238

Table 3-18. Cross Tabulation of TMAs and the Trip Reduction Ordinance

Trip Reduction Ordinance	Transportation Mgmt Association		Total
	Without Assoc	With Assoc	
Without Ordinance	43	23	66
Total %	56.6	30.3	86.6
Row %	65.2	34.8	
Column %	95.6	74.2	
Areas With Ordinance	2	8	10
Total %	2.6	10.5	13.2
Row %	20.0	80.0	
Column %	4.4	25.8	
Total	45	31	76
Percent	59.2	40.8	100.0

Fishers Exact Test

Observed Sample Taken Alone

$P = 0.00818$

One Tailed

$P = 0.00918$

Two Tailed

$P = 0.01252$

Chi Square = 5.58010 DF = 1 Prob = 0.0182

Relations with Monitoring Efforts - Employer associations are strongly associated with data gathering efforts to assess the effectiveness of their programs (Table 3-21). This is not a surprising outcome since the directors of these associations need to prove program effectiveness or they are out of a job.

Relations with transportation problems - The cross-tab analysis in Table 3-22 reveals only one statistically significant relationship between area traffic and transportation problems and employer associations. Only one area without existing problems has an Employers Association, and among areas that do have problems the likelihood is more than two to one that an employers association has been formed. The confidence level for this relationship is over .96.

Relations with government actions - Cross tabulation analyses of government actions have identified two sets of significant relationships. Employer associations, which have no highly significant correlations with business actions, do relate to government action. General bus transit improvements or connection to or creation of a rapid transit system is positively correlated with the existence of an Employers Association, at a confidence level of .994. Although a number of areas with employer associations report no government activity in bus or rapid transit improvements, all but one area which does report such government activity have employer associations (Table 3-23). TMAs, meanwhile, are significantly related to the implementation of auto-use reduction policies/ordinances or employer actions such as flextime, employer-sponsored vanpools and transit subsidies. Again, not all TMAs lead to such government actions, but in almost all cases of such action, a TMA exists in the area. The confidence level for this relationship is .973

Financing Mechanisms

Innovative financing mechanisms and contracting out for transit services are favored more highly by SAC's than CBDs, although their overall popularity is lower than the previously discussed items.

Impact Fees and Negotiated Investments - Financing techniques such as impact fees (which primarily are used in areas with new development) are used in 23 of 56 SACs reporting (41 percent), compared to only 29.4 percent of CBDs. Negotiated investments are very popular in large corridors (80 percent) and megacenters (60 percent) (Table 3-24).

Privately Contracted Services - Table 3-25 shows that privately contracted transportation services are reported in moderate but slightly higher proportions among SACs than among CBDs (53 percent versus 50 percent). CBDs, however, are more likely to employ competitive procurement for such services.

Table 3-19. Cross Tabulation of TMAs and Circulation Improvements

Circulation Improvements	Transportation Mgmt Association		Total
	Without Assoc	With Assoc	
Without Improvements	31	8	39
Total %	41.9	10.8	52.7
Row %	79.5	20.5	
Column %	70.5	26.7	
Areas With Improvements	13	22	35
Total %	17.6	29.7	47.3
Row %	37.1	62.9	
Column %	29.5	73.3	
Total	44	30	74
Percent	59.5	40.5	100.0

Fishers Exact Test

Observed Sample Taken Alone

P = 0.00019

One Tailed

P = 0.00022

Two Tailed

P = 0.00032

Chi Square = 12.0204 DF = 1 Prob = 0.0005

Table 3-20. Cross Tabulation of Employer Associations and Road Improvements

Road Improvements	Employer Association		Total
	Without Assoc	With Assoc	
Without Improvements	7	1	10
Total %	9.0	3.8	12.8
Row %	70.0	30.0	
Column %	25.9	5.9	
Areas With Improvements	20	48	68
Total %	25.6	61.5	87.2
Row %	29.4	70.6	
Column %	74.1	94.1	
Total	27	51	78
Percent	34.6	65.4	100.0

Fishers Exact Test

Observed Sample Taken Alone

P = 0.01470

One Tailed

P = 0.01714

Two Tailed

P = 0.02730

Chi Square = 4.67895 DF = 1 Prob = 0.0305



Table 3-21. Cross Tabulation of Employer Associations and Monitoring Efforts

Monitoring Effects	Employer Association		Total
	Without Assoc	With Assoc	
Without Monitoring	16	13	29
Total %	28.6	23.2	51.8
Row %	55.2	44.8	
Column %	76.2	37.1	
Areas With Monitoring	5	22	27
Total %	8.9	39.3	48.2
Row %	18.5	81.5	
Column %	23.8	62.9	
Total	21	35	56
Percent	37.5	62.5	100.0

Fishers Exact Test

Observed Sample Taken Alone

P = 0.00407

One Tailed

P = 0.00482

Two Tailed

P = 0.00614

Chi Square = 6.52737 DF = 1 Prob = 0.0106

Table 3-22. Cross Tabulation of Employer Associations and Transportation Problem

Transportation Problem	Employer Association		Total
	Without Assoc	With Assoc	
Without Problem	18	39	57
Total %	28.6	61.9	90.5
Row %	31.6	68.4	
Column %	78.3	97.5	
Areas With Problem	5	1	6
Total %	7.9	1.6	9.5
Row %	83.3	16.7	
Column %	21.7	2.5	
Total	23	40	63
Percent	36.5	63.5	100.0

Fishers Exact Test

Observed Sample Taken Alone

P = 0.01981

One Tailed

P = 0.02130

Two Tailed

P = 0.02130

Chi Square = 4.23889 DF = 1 Prob = 0.0395

Table 3-23. Cross Tabulation of Employer Associations and Transit Improvements

Transit Improvements	Employer Association		Total
	Without Assoc	With Assoc	
Without Improvements	21	23	44
Total %	34.4	37.7	72.1
Row %	47.7	52.3	
Column %	95.5	59.0	
Areas With Improvements	1	16	17
Total %	1.6	26.2	27.9
Row %	5.9	94.1	
Column %	4.5	41.0	
Total	22	39	61
Percent	36.1	63.9	100.0

Fishers Exact Test

Observed Sample Taken Alone

$P = 0.00155$

One Tailed

$P = 0.00164$

Two Tailed

$P = 0.00242$

Chi Square = 7.58539 DF = 1 Prob = 0.0059

Table 3-24. Financing Mechanisms

Type of Center	Impact Fees		Negotiated Investments	
	No.	%	No.	%
1. Office Park	7	77.8	2	25.0
2. Office Center	3	27.3	4	36.4
3. Large MXD	6	42.9	4	33.3
4. Moderate MXD	0	0.0	1	16.7
5. Megacenter	4	36.4	6	60.0
6. Large Corridor	3	60.0	4	80.0
7. SAC Totals	23	41.1	21	40.4
8. CBD	5	29.4	8	50.0

Table 3-25. Contracting Out Transit Services

Type of Center	Privately Contracted Services		Competitive Procurement of Contracted Services	
	No.	%	No.	%
1. Office Park	7	70.0	4	44.4
2. Office Center	6	54.5	3	27.3
3. Large MXD	10	62.5	6	50.0
4. Moderate MXD	2	33.3	0	0.0
5. Megacenter	3	30.0	1	10.0
6. Large Corridor	3	60.0	2	50.0
7. SAC Totals	31	53.4	16	30.8
8. CBD	8	50.0	6	40.0

CHAPTER 4. CASE STUDIES

The purposes of the case studies are three: first, to identify the nature of the mobility problem and the factors which influence the situation, second, to produce a comprehensive understanding of the way financing and management decisions were made in each case, and third, to assess the roles that the federal government, local public agencies and the private sector played in providing mobility solutions.

The findings from the cases are expected to be useful in interpreting the results of the empirical research and in the development of policy recommendations.

The literature review and preliminary results of the national survey identified potential cases for in-depth study. The case study sites were selected according to the following criteria:

- (1) Traffic congestion. There is an interest in centers in which congestion has been identified as a major problem.
- (2) Innovative public/private partnerships. Case study sites focused on successful public/private partnerships to address the transportation needs. Such partnerships may include innovative transportation land use design, financing, and or organizational mechanisms.
- (3) Representation of different types of centers. Each case study chosen represents a different type of center using Cervero's classifications.
- (4) Multiple centers within the metropolitan area. The case studies concentrate on one major center in each of the metropolitan regions, but include less detailed examinations of the other centers which constitute the activity center network in the area.
- (5) Geographic distribution. Since there is a nationwide scope of this research, effort was made to choose case study sites from across the country.
- (6) Overlap with other studies. The Rice Center case studies are not intended to repeat the products of other research efforts. However, some overlap may be deemed desirable in order to take advantage of available data.

Four suburban centers were selected as case studies which best meet the six criteria:

Los Angeles, focusing on Warner Center. Warner Center, classified as a megacenter, is a leader in ridesharing, and has an active employer association and TMA. It has been declared a transportation emergency area and is currently conducting a study to create a traffic impact zone. The development of trip-reduction strategies and the establishment of impact fees for new development is expected to be the outcome of this study. Other important suburban centers in the Los Angeles area include El Segundo/LAX Corridor, South Coast Metro, and Irvine Center.

San Francisco, focusing on Hacienda Business Park (HBP). HBP, defined as an office park, is a planned commercial development in the community of Pleasanton. In order to win approval for the development from the City of Pleasanton, HBP agreed to create a transportation systems management program and to contribute to roadway improvements through an assessment district. The TMO set up by HBP oversees the implementation of Pleasanton's trip reduction ordinance. Other major centers associated with the San Francisco area include Bishop Ranch Business Park, Walnut Creek, and the Golden Triangle (in Silicon Valley).

Baltimore, focusing on the Baltimore/Washington International Airport Corridor (BWI). BWI is a large mixed-use development, with light-industrial and warehousing activities as well as office development. BWI, a large mixed-use development, has experienced the problems of inadequate transit service and traffic congestion. Two major efforts have been made to alleviate these conditions. The first is the construction of a highway which will link the airport and I-95. The second is the BWI Commuter Transportation Center, the TMA for the area. The center has taken steps to improve mass transit including providing a shuttle for internal circulation, increasing the use of ridesharing and vanpooling, and increasing major employer participation in efforts to increase mobility. Additional major employment centers associated with the Baltimore metropolitan area: Hunt Valley, Central Towson, and Columbia.

Dallas, focusing on North Dallas Parkway Center. The Parkway Center is the largest and most congested megacentre in the Dallas area. The cities of Dallas, Addison, and Farmers Branch are in the process of coordinating development and developing transportation responses to address mobility problems in the area. The Dallas metropolitan area includes a number of significant suburban employment centers such as Las Colinas, a planned community, North Park, and Park Central.

The research team conducted field visits to the selected sites during the Spring of 1988. Factual information, as well as opinions on impacts and insights on processes were obtained through interviews with about 50 developers, property owners, officers of area associations, and local public officials at local and state governments, MPOs, and transit authorities.

Each case study describes first the city and region's socio-economic and travel characteristics, analyzes the major suburban employment centers, transportation planning process and actors, regional mobility issues, and provides an overview of public/private initiatives in the metropolitan area. Following the discussion of the region, each case study focuses on a target suburban center. Each one is described in detail, along with its mobility problems, transportation improvement initiatives together with financing and organizational structure. Finally, each case study concludes with a section on evaluating the center's efforts and describing general lessons that can be applied to other centers.

WARNER CENTER, LOS ANGELES

Warner Center is representative of master-planned employment centers in the Los Angeles area that seeks to mitigate traffic problems through a combination of public and private initiatives. This section will begin with an overview of the Los Angeles region's transportation infrastructure and other employment centers.

CITY AND REGION OVERVIEW

The City of Los Angeles is the second largest city in the nation and had a 1987 estimated population of 3,070,710. Los Angeles is the hub of the Los Angeles-Anaheim-Riverside consolidated metropolitan statistical area (CMSA) which had a 1986 estimated population of 13,074,800, an increase of 13.7 percent since 1980. According to the Southern California Association of Governments (SCAG), by the year 2000 population in the CMSA is expected to increase to 16.4 million.

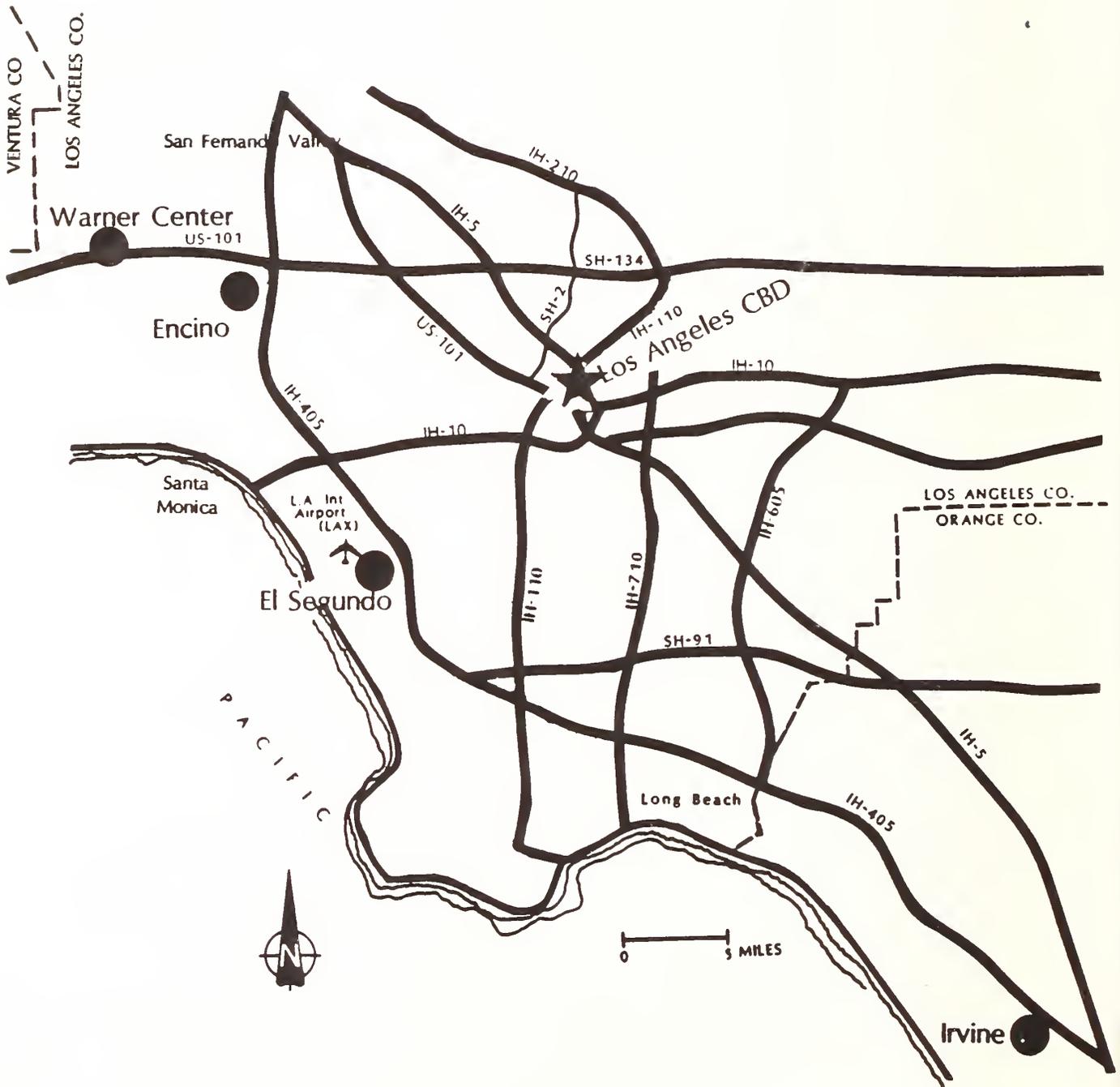
The economy of Los Angeles traditionally has relied on a base of manufacturing, finance, development, and services. In 1987, SCAG reported that Los Angeles' economy produced \$250 billion worth of goods and services, which would make the metropolitan area the world's 10th largest "nation" in terms of gross national product.

Population growth and the strong economy have combined to create a jobs/housing imbalance in the region. Many new jobs are located in the CBD and other employment centers on the western side of the city, yet workers are forced to look inland to find new affordable housing. Most of the central and western Los Angeles area has become built out, and developers must reach further to the east for large parcels of undeveloped land to create the suburbs of single family detached houses preferred by consumers. This jobs/housing imbalance leads to longer commute times and more congested roads.

Delays in transporting workers and goods are creating concerns for the long term economic health of the region. Some manufacturing and warehousing jobs have already been lost to outlying cities as far away as Las Vegas and Phoenix, where land and housing are more affordable than in Los Angeles. For the first quarter of 1988, the median price of an existing home in Los Angeles area was \$159,500, or seventh highest in the nation. The median price of an existing home nationally was \$87,700.

In 1985, the approximately 300,000 acre city of Los Angeles had 6,500 miles of streets and roads and 220 miles of freeways, expressways and highways. In the past, these roads helped Los Angeles to maintain a level of mobility that was seen as the hallmark of the area (see Figure 4-1). However, continued population growth without a concomitant

Figure 4-1. Employment Centers in the Los Angeles Area



growth in freeway and roadway miles has led to severe congestion problems. A recent New York Times article revealed that, "The country's four busiest freeway interchanges are in Los Angeles County, as are six of the top ten. Two of the other top 10 spots are in neighboring Orange County." Current trends are expected to continue since the number of planned freeway and roadway miles cannot accommodate present population levels, not including expected population growth.

The City of Los Angeles and other concerned governmental and business groups have recognized mobility as the key to the maintenance of economic standards and quality of life that have made Southern California attractive. They are using a combination of programs to address the problem including increased mass transit, reduction of single-occupant commute vehicles, high-tech approach to traffic management in the form of "smart street" projects, and traffic mitigation to address the problem. In addition, comprehensive ordinances have been created which target the mitigation and/or reduction of the amount of existing and anticipated automobile traffic.

There are 175,000 employees in the 1,100 acre downtown. Forty percent of the commuters to the downtown rideshare (which rises to 60 percent at peak) vs 20 percent for the city as a whole. About four years ago, Mayor Bradley formed a blue ribbon committee composed of private and public members to study transportation issues in the CBD. The Committee made 71 recommendations for improving traffic downtown. Parking management has been implemented through development agreements. They include a requirement that 60 percent of parking be on site and 40 percent be in peripheral lots connected to the downtown by shuttle. The Central City Association, an organization of downtown employers, advocates transit subsidies, and the establishment of a TMA. Downtown businesses have agreed to contribute a significant portion of the cost of Metrorail through a benefit assessment district. Office space within a 1/2 mile radius around the four downtown subway stations has been assessed at a rate of \$.30 per gross usable square feet. The additional 5 million square feet of office space which is expected to be built by 1992 will reduce the per square feet assessment.

The Transportation Planning Process

Suburban mobility is affected by land use, density of development, road capacity, and availability of mass transit. Planning and implementation concerning suburban mobility projects are handled by many different agencies in the Los Angeles area. Some of their duties overlap in scope, geographic area, or project result. In addition, the decision was made to separate the mass transit operations of SCRTD from policy making functions, which are now handled by LACTC. The various public and private agencies are described below.

The Los Angeles County Transportation Commission, LACTC, is responsible for planning, programming, budgeting, monitoring, and coordinating the activities of highway and transit agencies in the county. The Commission manages income derived from the Proposition A half-cent sales tax, of which 35 percent is dedicated to mass transit improvements and which will be used for the creation of the region-wide rail transit system. This system, operated by the Southern California Rapid Transit District, will have both light and heavy rail lines that will connect the major residential and employment centers with the central

business district and each other.

The Southern California Rapid Transit District, SCRTD, is currently the largest bus-only system in the nation, both in the number of buses and in the area served. LACTC funds SCRTD as well as determining routes and areas served. In recent years, SCRTD has been criticized because of high operating costs and a deterioration in service. More and more, SCRTD is being asked to compete against the private sector to provide services such as commuter express routes. In addition, the Foothill Transportation Zone in the San Gabriel Valley, representing 30 percent of their operating area, was created because of community pressure to make their transportation dollars go farther by competitively bidding routes.

In response, SCRTD is trying to get out of the mode of being a big bus operator, and is prepared to address immediate and long term suburban mobility needs. It has recently instituted successful express bus and reverse commuter services between major employment centers including Encino, Westwood and the downtown. In addition, SCRTD is actively promoting a transit pass program and brokering transportation services. Although their plans include expanded commuter and internal circulation services in suburban centers, they are prohibited from doing so by a LACTC imposed limit on funds and on the start of new services.

SCRTD is in the process of constructing the first section of the Metrorail project, MOS-1, 4.4 miles. Routes for the second section, MOS-2, have been selected and local funds committed of a nine-year program. Two benefit assessment districts have been established by SCRTD that will generate \$130 million of the approximately \$1 billion cost of MOS-1. The process for determining benefit assessments for MOS-2 is underway.

The City of Los Angeles Department of Transportation has the responsibility for planning, developing and implementing transportation improvements, and reviewing development proposals for traffic impacts. The city developed enabling legislation which allows areas with critical transportation problems to implement impact fees, or other revenue sources etc., in order to solve them. A ride-share ordinance was also passed that forced employers and building owners to reduce their employees' peak hour demand on roadways. The City can also mandate circulation improvements as a condition for the issuance of building permits. City Planning is working to change parking codes dealing with spillover from employment centers. They are considering requiring additional on-site parking for new development.

The City is using some of their Proposition A funds to take some existing commuter routes from SCRTD and contract them to private providers at an approximately 30 percent savings. Funds are disbursed by LACTC, and are allocated 50 percent to capital and 50 percent to operating costs. SCRTD is resisting this, citing that their most successful routes are being taken away, forcing their operating deficit higher.

The Southern California Association of Governments, SCAG, serves as the council of governments for an area encompassing Los Angeles, San Bernardino, Orange, Riverside, and portions of Ventura and Imperial Counties. As the metropolitan planning organization for the region, SCAG is responsible for preparing the regional transportation plan with input from 75 local and county governments, as well as Caltrans and the California

Highway Patrol. The Regional Transportation Improvement Plan (RTIP) for the six-county SCAG region is a five-year multimodal program of regional transportation improvements for highways, transit, and aviation. The RTIP consists of projects consistent with the Regional Transportation Plan (RTP). The projects are directed at improving the overall efficiency and people-moving capabilities of the existing transportation system while incrementally moving toward long-range planning.

The Southern California Air Quality Management District, SCAQMD, is one of six Air Quality Management Districts formed by the State of California in response to EPA regulations requiring the improvement of air quality. Since its inception, the district has successfully fought to clean up stationary pollution sources such as manufacturing and petroleum refining operations, and is at work on mobile sources such as cars, buses, and trucks. SCAQMD has used its state and federal mandate to justify the creation of regulations aimed at reducing, not just shifting, peak hour roadway demand. Its Regulation XV has the power to change the commuting patterns of millions of workers, and is discussed below.

The California State Department of Transportation, Caltrans, is responsible for the construction and maintenance of California's extensive freeway system. Because of the saturation of the freeway system, Caltrans has sought to increase freeway capacity with commuter and high-occupancy vehicle (HOV) lanes on some freeways, although during the current improvements to the Ventura Freeway it was decided not to install HOV lanes. Caltrans also provides major funding for CommuterComputer, a privately operated commuter assistance corporation discussed below.

CommuterComputer, also known as Commuter Transportation Services (CTS), Inc., is a private, not-for-profit organization designed for the purpose of improving commuter mobility. They also provide educational services to employers that are interested in forming TMOs, or who need help in starting and running commute management programs. With the passage of SCAQMD's Regulation XV, they have prepared a package of services for affected businesses which includes surveys of employee commute patterns, registration and matching of commuters, help in forming carpools and vanpools, and a three-day training program for designated transportation coordinators.

Transportation Ordinances and Regulations

The City of Los Angeles and SCAQMD are attempting to use their regulatory powers to alter transportation patterns in the Los Angeles area. In addition to the major regulations and ordinances described below, voters last year approved Proposition U in which many commercial areas were down-zoned and building height limits were instituted for all of Los Angeles except for the downtown area. This proposition and similar initiatives are the result of the slow growth movement throughout California, which stems from a concern that unchecked growth is resulting in a deterioration in the quality of life, as well as a higher costs for taxpayers.

Trip Reduction and Improvement Plan (TRIP), Final Ordinance No. 162060, approved March 2, 1987, contains enabling legislation to provide the framework for development of transportation area specific plans, including demand management and ridesharing traffic

reduction measures. Areas with severe mobility problems are allowed to declare a transportation emergency and ultimately create a Transportation Improvement Zone, TIZ. To declare an emergency, the city must show that a majority of the intersections have a level of service "E" or worse, where "D" is capacity. The TRIP is used on an interim basis while a area specific transportation ordinance for the TIZ is created. An environmental impact report is not required to obtain the interim control ordinance approval, although one is done as part of the study for the final ordinance. The formal studies are funded by the city, which hires consultants to perform the work.

The legislation halts the issuance of new building permits unless the developers can demonstrate mitigation of the traffic impact of their developments. This ordinance was based on one enacted in the LAX Corridor in 1984. Five areas have created temporary zones. The city must document needed transportation improvements for the area, so that the impact fees can be shown to be directly related to the improvements and therefore are not labeled as taxes.

Examples of mitigation include specific packages of ridesharing, and trip fees based on regional impact. In general, new development must mitigate its own impacts within one mile, as well as contribute to subregional mitigation within the established zone. One of the elements of the EIR shows the impact of the ordinance on air quality.

Los Angeles was heading towards a moratorium on building because of increasing traffic problems. Instead, the Braude Ridesharing Ordinance, Ordinance No. 162151, was approved April 10, 1987. The City of Los Angeles called for employers with 700 employees or more or for buildings with 550,000 square feet or more to prepare a traffic mitigation plan to involve workers in ridesharing, off-peak travel, or other traffic mitigation measures. The City was responsible for regulating compliance with the ordinance, which paved the way for the SCAQMD ordinance and was superceded by it.

In an effort to reduce regional air pollution, SCAQMD created the Trip Reduction/Indirect Source Regulation XV, which requires all employers of 100 or more to develop and implement transportation plans in order to achieve a specified average vehicle ridership (AVR). The AVR is calculated by dividing the employee population at a given site arriving to work between 6:00 and 10:00 am by the number of cars driven and parked by the employees. The average AVR level for the Los Angeles basin is currently 1.15, and SCAQMD targets 1.75 in the CBD and 1.3-1.5 in outlying areas. SCAQMD is interested in measures such as ridesharing because they want to reduce mobile pollution sources and not just spread the traffic over a longer time span, as occurs with flex-time. Regulation XV went into effect July 1, 1988, and SCAQMD will accept plans submitted under the Los Angeles ordinance to meet first year requirements.

Major Suburban Employment Centers

In contrast to the central city development common to older cities, Los Angeles developed as a network of smaller cities and community areas around the downtown core. Many of these smaller cities and master planned communities have become large employment centers as the region has grown, causing complex traffic patterns. In addition to compliance with the major regulations and ordinances discussed above, some major employment

centers have developed their own standards of dealing with mobility problems. Some outstanding examples are: the LAX Corridor, Irvine, and Warner Center, the subject of this case study. An overview of these selected employment centers follows.

The LAX Corridor, also known as the Coastal Transportation Corridor, encompasses approximately 34 square miles in the South Bay area of Los Angeles County. The area includes major traffic generators such as the Los Angeles International Airport (LAX), Marina del Rey, and a concentration of companies in the aerospace industry. Within the next ten years, 41 million square feet of new office, commercial, industrial, and residential development has been proposed by the Hughes Corporation and other major area developers. In 1981, one of the first employers associations dedicated to addressing the transportation problems associated with tremendous growth was established in El Segundo, located within the LAX Corridor.

In 1984, after congestion on roadways in the area had reached critical levels, the City of Los Angeles established the **Coastal Transportation Corridor Specific Plan, Ordinance No. 160.394**, which regulates development and establishes a transportation trust fund to cover costs directly associated with construction of public transportation facilities built to ease further congestion caused by new development. The trust fund is fed by an impact assessment fee based on the number of trips generated by new development. A one-time fee of \$2,010 per p.m. peak hour trip or the equivalent of \$5 per square foot has been levied on new development. Developers can reduce their fees if they institute trip reduction measures. The ordinance also encourages credits for investments into a proposed light rail system. According to LA DOT, more than \$190 million will be committed to public transportation improvements within the corridor.

Other areas that are developing transportation specific plans include Ventura Blvd, Westwood West, Warner Center, Center City West, Wilshire West, and the downtown.

The City of Irvine (1980 population 62,134), is located in Orange County to the south of Los Angeles. Irvine has experienced phenomenal growth over the past twenty years due to its location at the juncture of two major freeways, the University of California, and the master-planned development of the Irvine Ranch by the Irvine Company. The latter developed a TMA in 1986 to serve its Irvine Spectrum development. Among other duties, the TMA works to act as an transportation information resource, develop transportation programs and work with municipal agencies to reduce traffic in the development and surrounding area, and to establish annual goals for ridesharing. The Irvine Company also pioneered developer contributions to major roadway improvements such as freeway ramps and overpasses. Like other planned developments, often traffic problems begin at the perimeter of the development and extend outward.

WARNER CENTER

Warner Center is a 1,100-acre master planned, mixed-use real estate development. It is located on the site of a thoroughbred horse breeding ranch acquired in the 1940s by Harry Warner, former president of Warner Brothers Pictures, Inc. Over the next two decades, parcels of land were sold and later developed, into the Rocketdyne plant (1955), the Litton Industries plant (1960), and Topanga Plaza Shopping Center (1965). In 1968, some 630

acres were sold to Aetna Life and Casualty for \$30 million, and the following year a partnership between Aetna and Kaiser Aluminum and Chemical was formed to develop the land.

In the early 1970's, Warner Center was designated by the Los Angeles City Council as the urban center for the Canoga Park-Winnetka-Woodland Hills Planning District. The City had decided to direct growth into predetermined centers rather than allow urban sprawl to continue unchecked, and Warner Center was allowed to develop at maximum density.

The majority of the land held by Kaiser Aetna has been developed into various retail, light industrial, residential and office properties, giving Warner Center a sub-city character. The shopping malls and residential properties are targeted towards the higher end of the household income spectrum. Eighty acres of commercial property remain to be developed, of which fifty are owned by Warner Center Properties, one of the prime forces behind the Warner Center Association.

The figure varies according to whether all employees of each company are counted, even if their place of work is outside the immediate boundaries of Warner Center. Total employment in Warner Center is currently estimated at between 30,000 and 45,000. In 1984, there were 395 individual employers, with five major companies representing 34 percent of the total Warner Center employment. Although large engineering and insurance companies are the dominant type of employers, there are many small businesses offering real estate, legal and banking services. The largest employers are the engineering/ manufacturing firms of Rocketdyne (4,000), Litton (3,000), and Dataproducts (1,500); the insurance companies of Blue Cross, Prudential, 20th Century Insurance and Weyerhauser Mortgage Insurance (700-2,000 employees range); Kaiser Permanente Medical Center, and the Los Angeles "Daily News" newspaper.

Warner Center Association

The Warner Center Association, WCA, was formed in 1982 with the expressed goals of increasing emergency preparedness, developing on-site child care, and improving mobility. There are currently 20 corporate members, although the bylaws allow for up to 24. The Association charges a \$3,000 annual membership fee. Members include the two retail centers, the Voit Companies, Marriott Hotel, Blue Cross, Kaiser Hospital, and Rocketdyne. As transportation problems have become more pressing, more of the WCA's time and energy have been expended in attempting to resolve these issues. A transportation sub-committee was formed to help members to comply with the various local traffic ordinances.

A Warner Center TMO was formed in May 1988 with sixteen participating companies and an annual operating budget of \$125,000. The TMO developed an integrated ridesharing plan and set as 12 month targets to increase average vehicle ridership by 10 percent, a reduction of 598 vehicles used for commuting, and the creation of an additional 30 vanpools and 117 carpools. The TMO will also fund the position of a commute manager. Currently, one of the participants in the TMO is not a WCA member and the TMO hopes to increase this outside participation later.

Transportation Issues

Warner Center is served by a network of surface streets and arterials and the Ventura Freeway (US 101) (see Figure 4-2). Mass transit is offered by SCRTD. Within the largely master planned confines of the Warner Center area, streets are broad and parking is ample, creating a comfortable environment for automobiles and an uncomfortable one for pedestrians. There is a core of high-rise office buildings separated by landscaped areas, with a periphery of low rise buildings. The Center has mobility problems for pedestrians within its confines, and accessibility problems due to the over crowded Ventura Freeway.

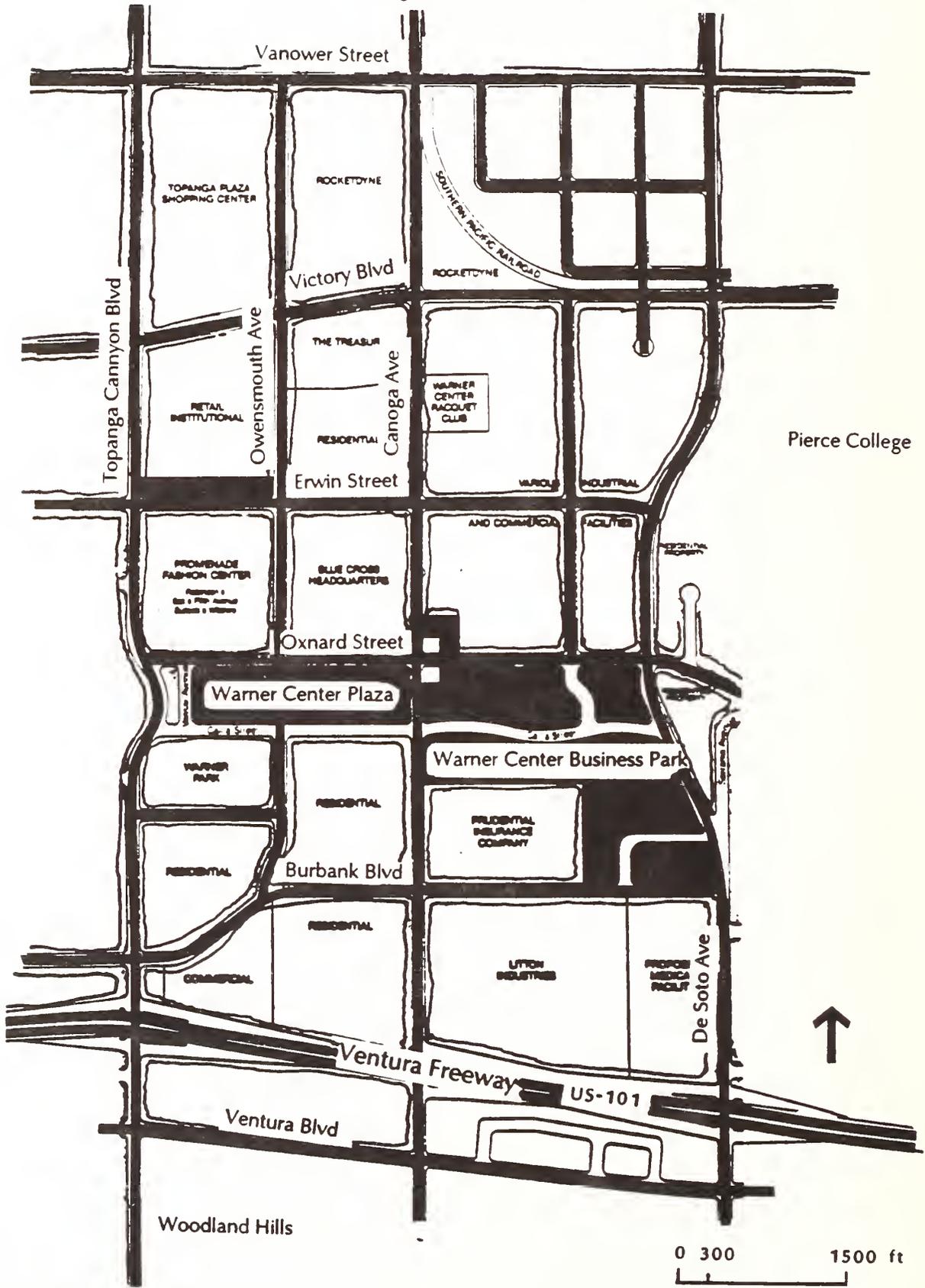
In 1984, Warner Center was given a demonstration grant from the City's Proposition A funds to set up a self-sustaining rideshare program with the assistance of CommuterComputer. As part of the project, they also studied employee travel patterns, and supported an on-site rideshare coordinator. The position of rideshare coordinator was not renewed by the WCA board, however the project did provide the basis for increased awareness by employees of the need for ridesharing, as well as providing a good database on the transportation modes and preferences of Warner Center workers.

By surveying Warner Center employees, CommuterComputer found that their travel characteristics follow very defined patterns.

- Eighty-four percent commuted by driving alone in their automobile, 10 percent commuted by carpooling, and the remaining 6 percent commuted by vanpooling, motorcycling, or some other mode.
- Sixty percent of workers arrived at work before 8:00 am and leave between 4:30 and 5:00 pm.
- Sixty percent of workers commuted 15 miles or less, and thus generally lived and commuted within the San Fernando Valley.
- Sixty percent of workers made some stops during their commute, making ridesharing more difficult.

Since the majority of workers have regular hours, CommuterComputer thought that the Warner Center area had the potential for a successful ridesharing program, especially if employers allowed some moderate flex-time. However, they also found that employees needed cars to run errands before or after work, or during the day, and that created a deterrent to ridesharing for many. A substantial number of workers also work swing or night shifts, resulting in a lower overall peak hour roadway demand for the area, and again reducing ridesharing opportunities.

Figure 4-2. Warner Center



Almost 40 percent of Warner center employees use the Ventura Freeway during at least part of their journey to work. This freeway is currently operating at level of service D, and travel will be severely constricted over the next several months as Caltrans works to expand freeway capacity.

Mobility Improvement Initiatives

The WCA, through its transportation committee, has expended much energy to improve mobility in Warner Center. Past efforts include increased ridesharing efforts and employee education. Companies give preferential parking spaces to vanpools and carpools. New buildings are designed to accommodate bus and vanpool drop-off zones. The Voit Companies recently agreed to expend \$5 million to mitigate existing traffic, and they are currently involved in negotiations with the Los Angeles DOT as to how the money should be spent. Demand management has been identified as having top priority in considering use of this money.

In addition, the City of Los Angeles has begun a transportation study for the creation of a Transportation Improvement Zone (TIZ) in Warner Center. The study will be performed by a local consultant, Kaku & Associates, with Barton/Aschman serving as the subcontractor. The proposal was approved by City Council in the spring of 1988, and the study is expected to be completed in 1989. The WCA will provide input on the development of the final ordinance. Money generated by the zone will go for transportation infrastructure improvements in the Warner Center area.

The development of area ordinances has benefitted by the model ordinance created for the LAX Coastal Transportation Corridor, and the following items are likely to be incorporated into any ordinance created for Warner Center. For example, there was concern about the way a trip fee would affect small businesses. The consultants found that an exemption for small businesses not located in shopping centers would help. They are still responsible for traffic they generate, but not for regional impact fees because they generate little regional traffic. In addition, the fee in the LAX corridor can be paid over a period of 20 years. It was calculated as the estimated total cost of improvements divided by the number of daily trips generated in the area. Fees have been collecting in the escrow account too slowly to float bonds for immediate improvements, and future area ordinances, like the one in Warner Center, will likely have a fee of \$5,000 per trip with more money paid up front. The concept of an interim fee was created so that businesses are given confidence about the size of the final fee and do not feel as if they are being asked to sign a blank check. The fee is not a tax, but is collected in specific areas for specific improvements, as it would be in Warner Center.

EVALUATION AND DISCUSSION

Warner Center is often cited as one of the most progressive suburban activity centers in terms of addressing transportation issues. It is on the leading edge of suburban centers working to mitigate traffic problems with a combination of public and private initiatives at the center and city levels. Mobility issues were addressed by individual employers and the Warner Center Association before city and state regulations mandating action were

enacted. Some of the major employers have shown strong commitment to ridesharing programs, subsidizing vanpools, and instituting flextime. The Warner Center Association's transportation committee began by providing assistance to members in compliance with the various local ordinances. Now they have formalized a TMO and can expand planning and services. The availability of an experienced regional transportation broker like CommuterComputer, and the city's overall program coordination preempt the need for employers to even join the WCA.

Los Angeles has developed a national reputation for its low density suburban centers, like Warner Center, linked by a system of freeways and arterials and dependency on the single occupancy private car mode. The rapid population and employment growth of the recent past, coupled with reduced state and local funding for roadway improvements led to such traffic congestion and air pollution that the city was heading toward a building moratorium in some areas. As a response to this situation, the city in recent years has drastically changed its approach to addressing mobility problems by undertaking:

- a city-wide effort to manage travel demand, through trip reduction and ridesharing ordinances,
- major rail projects funded in part with the private sector's financial support, and
- privatized bus operations in some local areas.

Enforcement, close monitoring, adherence to promises, and policy coordination by the public sector are critical if such efforts are to succeed in the future. Enforcement of ordinances and monitoring of performance is expensive and very difficult to measure. This is an area in which the city and the local associations need to cooperate. Peer pressure within an employers' association can have significant effects on the creation and character of a TMO.

The separation of policy from operations in transit provision in Los Angeles, where LACTC sets the policy and SCRTD is responsible for operations, according to one view has been successful by privatizing a great portion of SCRTD's bus transit services, thus reducing operating costs and improving the quality of service. According to another view, such separation can be detrimental for the transit dependent if service provided by different operators is not fully coordinated. Public agencies need to be allowed to compete fairly with private providers and administrative costs must to be properly accounted for when comparing public and private bids.

On the other hand, coordination of public policy and bold leadership are important in the implementation of ridesharing programs and HOV lanes on freeways. To change the public's attitude and behavior requires strong incentives. Conflicting policies of increased parking advocated while ridesharing is being mandated are counterproductive. According to local sources, HOV lanes have come a long way from being considered totally unacceptable in the early 1970s to being considered as a viable solution in the 1980s. Caltrans perhaps missed an opportunity to strongly support the HOV lanes on Ventura Freeway due to opposition by vocal residents.

HACIENDA BUSINESS PARK, PLEASANTON, CALIFORNIA

This case study will profile the City of Pleasanton and its major office development, the Hacienda Business Park.

THE SAN FRANCISCO BAY AREA OVERVIEW

Bay Area regional profile

The San Francisco Bay Area (see map, following page) is the nine county region encompassing San Francisco Bay and San Pablo Bay, containing 98 cities and a population of more than 5.7 million people. About 742,000 people live within the City and County of San Francisco. The U.S. Census Bureau defines the San Francisco Consolidated Metropolitan Statistical Area (CMSA) as all of the Bay Area counties plus Santa Cruz County.

At the southeastern edge of San Francisco Bay is Santa Clara County, the most heavily populated county in the Bay Area. Santa Clara County contains San Jose, the fifteenth-largest city in the nation with more than 637,000 people. Silicon Valley is the popular name for the cluster of industrial towns in San Mateo and Santa Clara counties; a part of Silicon Valley in north central Santa Clara County known as the Golden Triangle was studied as a part of the activity center review.

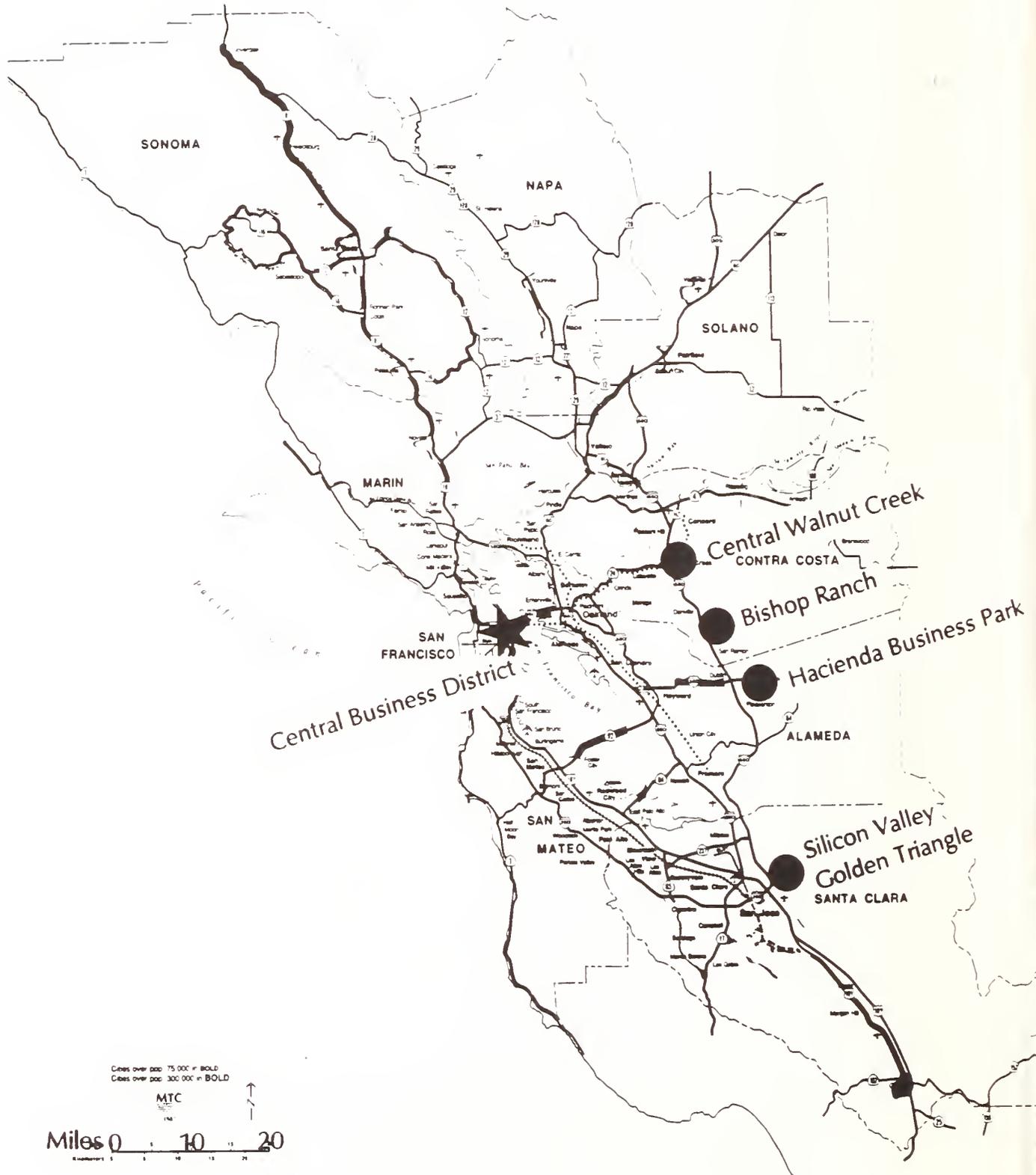
Alameda County lies north of Santa Clara County; Fremont, Hayward, and Pleasanton are in the central area of the county. The Hacienda Business Park, a suburban activity center investigated as a part of this case study, is in Pleasanton. The northwestern arm of Alameda County encompasses the cities of Oakland and Berkeley. Oakland is the third largest city in the Bay Area with 339,000 people. East of San Pablo Bay and south of Suisun Bay is Contra Costa County, which contains Concord, Walnut Creek, and San Ramon. The central area of Walnut Creek and the Bishop Ranch Business Park in San Ramon are suburban employment centers studied as part of this project.

Overall, the Bay Area has experienced a population growth of 10.9 percent in the period from 1980 to 1987. This is significantly less than the statewide average growth of 16.9 percent and the 17.8 percent growth in the Los Angeles-San Diego Area during this same period (Contra Costa County, 1988). Between 1980 and 1987, Alameda County increased in population by 122,000 people (an 11 percent increase) and Contra Costa County increased by 87,600 people (13.3 percent).

Bay Area mobility issues

Congestion is an increasing problem on the interstates which serve the Bay Area. Interstate 680 runs north/south through the central portions of Contra Costa and Alameda counties. It connects the cities of Concord, Walnut Creek, San Ramon, Pleasanton, Fremont, and San Jose (see Figure 4-3).

Figure 4-3. Employment Centers in the San Francisco Bay Area



In 1980, 23 percent of the 2.5 million workers in the Bay Area did not work in the county in which they lived (Metropolitan Transportation Commission, 1987). In western Contra Costa and Alameda counties along the congested Interstate 80 corridor, it is expected that by the turn of the century there will be 132 employed residents for every 100 jobs (MTC).

There exists substantial city-to-suburb and suburb-to-suburb commutes in the Bay Area. Since 1980, the number of commuter trips from Marin and Sonoma counties into San Francisco has dropped by about one percent per year, while commuting from Sonoma County into Marin County has increased by more than seven percent per year. This reflects the fact that many of the North Bay jobs are being created in Marin County, while affordable housing is concentrated in Sonoma County (MTC).

There are currently no freeway lanes reserved for High-Occupancy Vehicles (HOV's) on I-680 or I-580. Several years ago, a lane on I-580 was reserved for HOV's. Area commuters were angered by the congestion which resulted and the under-utilization of the lane. Public pressure led to special legislation prohibiting HOV lanes on I-580.

The Environmental Protection Agency (EPA), as authorized by the Clean Air Act, promulgated national ambient air quality standards (NAAQS) for air pollutants. The Bay Area did not meet the 1982 or the 1987 deadlines for complying with limits for ozone and carbon monoxide (CO). Traffic congestion contributes substantially to the air pollution, with the worst CO levels conditions found in downtown San Jose. Future plans for coming into compliance with NAAQS are likely to include:

- Mobile source controls, further limiting auto emissions.
- Alternative fuels.
- Stationary source controls, affecting industrial sites.
- Intermittent controls, which would go into effect during periods when air quality violations are likely to occur (Association of Bay Area Governments, March, 1988).

In an effort to fight urban sprawl, the 1972 State Legislature adopted the Local Agency Formation Commission (LAFCo) Act. Under this act, each county in California forms a Commission to designate a "sphere of influence" for each city and special district in the county. These spheres of influence are urban limit lines, often of a 20 year duration, defining that city's ultimate boundaries or service area. The LAFCo reviews requests for annexation to local cities and special districts.

In 1978, California voters approved Proposition 13, which placed a cap on property taxes. After Proposition 13, California counties found it advantageous to encourage development in unincorporated areas in order to expand their tax bases. This defeated some of the purposes of the 1972 LAFCo act, which was intended to keep growth within the defined boundaries of cities.

A trend among employees to move closer to their suburban workplaces over time has been noticed in communities such as San Ramon and Pleasanton. Several of the major employers in Bishop Ranch and Hacienda Business Park relocated from San Francisco. Over time, employees living in areas oriented towards a commute to San Francisco have changed residences to locations more accessible to the suburban sites.

Although former San Francisco employees may move closer to their new suburban workplaces, their suburb-to-suburb commute distance has not necessarily become shorter than their previous suburb-to-city commute. Several studies indicate that as employers migrate to the suburbs, journeys to work and levels of roadway congestion are increasing, not decreasing. In a 1987 study of this phenomenon, Dr. Robert Cervero defined several factors which compel suburban workers to live farther from their workplaces than they desire. These factors include:

- Shortages of affordable housing near suburban business developments. Many suburban jobs are non-professional; the average worker cannot afford to buy the single-family houses which dominate the residential markets in suburban communities.
- Zoning policies which exclude housing in favor of other land uses. Non-residential uses generate more tax revenue and less demand for public services such as schools.
- Growth limits in suburban communities which restrict new residential growth near business developments in order to maintain homogeneous communities.
- The reluctance of house owners to change residences, especially in areas with increasing housing prices. Workers who settled in communities near their original jobsite may not wish to change residences if they change jobs or if their company relocates. Moving closer to the workers is one rationale behind relocating a firm in the suburbs; however, the firm is invariably moving away from some (if not the majority) of the workers.
- Increases in the percentage of households with two wage-earners. A residence may be selected between two worksites, creating tolerable but sub-optimal commutes for one or both wage-earners. Many suburban jobs are of the back-office type, attractive to persons holding a secondary job for a household. The primary job may determine the location of the residence, creating longer commutes for the person occupying the secondary, suburban job (Cervero, May, 1987).

Suburban communities often lack the transit infrastructure of the urban areas. Thus, firm relocations to the suburbs tend to reduce the ability of the workers to utilize transit which increases the congestion on area roadways. Some Bay Area communities are requiring office developers to aid in the financing or construction of residential units, and are revising general plans and zoning ordinances to allow for mixed use to include residential uses in previously planned commercial areas (ABAG, January, 1988).

Bay Area Transportation Planning Process

The Metropolitan Transportation Commission, MTC, is the Metropolitan Planning Organization (MPO) for the Bay Area. MTC was created by the California State Legislature in 1970 to prepare and annually revise the Regional Transportation Plan (RTP) for the San Francisco Bay Area. The RTP is the transportation element for the Regional Plan of the Association of Bay Area Governments (ABAG); and, conversely, the land use policies of

ABAG's plan guide the development of the RTP.

The commission is funded by a share of the Transportation Development Act 1/4-percent sales tax and federal sources. MTC has been granted increased funding responsibilities. In addition to preparing the RTP, MTC is responsible for:

- The approval of transportation projects that receive state or federal funding.
- The allocation of several sources of funds for transit operations.
- The evaluation of the performance of the transportation system and the provision of transportation services.
- The promotion and setting of guidelines for transit system coordination, so that the 23 public transit systems in the Bay Area can serve to connect the region.
- The advocacy of adequate transportation funding (MTC, 1987).

Association of Bay Area Governments, ABAG, develops land use projections for the Bay Area. It was the first council of local governments in California, created in 1961. ABAG receives a portion of its funding through MTC, and the two agencies work in close cooperation.

The Bay Area Rapid Transit District, BART, provides heavy rail service to San Francisco County, the western edge of Alameda County, and the western and central portions of Contra Costa County. The system is composed of four lines totaling 71.5 miles in length. There are 34 stations; average station spacing is 1/2 to 1 mile in urban areas and 2 to 4 miles in suburban areas. The system currently carries about 200,000 passengers per day, totaling about 60 million per year. BART contracts for an express bus service to carry passengers between the stations and the suburban areas in Contra Costa and Alameda counties not on the heavy rail lines.

The BART service is oriented towards the San Francisco and Oakland CBD's rather than the reverse commute to the suburban developments. Of the 200,000 daily trips on BART, more than 50,000 trips are within the west Bay area, more than 100,000 are to or from San Francisco, and less than 20 percent are from one east Bay suburban location to another. Two reasons for low inter-suburban ridership are the lack of parking at BART stations and the ease of roadway travel in the east Bay area. BART and the Alameda Contra Costa Transit District (AC Transit) bus system provide about 53 percent of the transbay trips between Oakland and San Francisco.

San Francisco, Contra Costa, and Alameda counties participated in the creation of the system. Eighty percent of the capital cost of the system was provided locally, with only a 20 percent federal share. These three counties also subsidize the operations of BART, mainly through sales taxes.

BART desires to extend the heavy rail system to the San Francisco International Airport in San Mateo County and to Milpitas and San Jose in Santa Clara County. Under state law, BART cannot serve areas in other counties with rail or express bus service until service is provided to eastern parts of Contra Costa and Alameda counties. Residents of those areas of the county contributed to the development of BART, and feel they should be served by the next system expansions.

In March, 1988, the Metropolitan Transportation Commission adopted a \$2.1 billion plan to improve heavy and light rail systems throughout the Bay Area. This plan includes BART extensions within Alameda and Contra Costa Counties and an extension south to San Francisco International Airport. Other proposals include additions to the Santa Clara County Guadalupe Light Rail Transit project in San Jose, and additions to the San Francisco Muni-Metro light rail and the CalTrain Peninsula commuter rail systems.

In November 1986, voters in Alameda County approved an additional 1/2-cent sales tax to support the BART extensions to Dublin/Pleasanton and to Warm Springs. Voters in Contra Costa County approved by 70 percent on the November, 1988 ballot to increase their sales tax by 1/2-cent to support the extensions in the county; this was rejected by the voters 53 to 47 percent in a 1986 referendum. In June, 1988, voters in San Mateo County approved an additional 1/2-cent sales tax; this tax will help pay for the extension of the CalTrain service into the San Francisco CBD. San Mateo county has already reached an agreement with BART to contribute \$200 million to "buy in" to the BART system, and an additional \$148 million for the airport extension.

According to BART advocates, the growth of the San Francisco CBD can be attributed to a great extent to BART's influence. Office development has occurred near the BART stations in Walnut Creek, Pleasant Hill, and Concord in Contra Costa County. While BART stations may influence the location of new development, a study found no significant increase in suburban property or residential values as a result of BART stations (Blayney Associates, November 1978, and April 1979).

In the past few years, BART has worked with local communities to promote joint development near stations. Their goal is to generate increased revenue from the use of BART air rights and parking facilities and the increase in ridership. Limitations on growth in several communities and the wealth of existing office space have prevented any major joint development actions to date.

Between 1974 and 1988, BART contracted with the public AC Transit to provide a residential connector service. In August 1987, BART competitively bid this service. In April Laidlaw was awarded a five year contract to provide this service at a cost 20 percent less than that of AC Transit. The unions and management of AC Transit are opposing this action.

Suburban bus transit services. The loss of the BART contract by AC Transit reflects a trend toward newer, more responsive bus transit services in the suburbs. Older public agencies are reducing service. AC Transit has been criticized as non-responsive. At the same time, several transit agencies have formed in the past few years. These new transit agencies use contracting with private operators to provide services at lower costs. The Central Contra Costa Transit Authority (CCCTA) serves areas not served by AC Transit. It is a joint powers authority; it receives its authorization from those cities served. The Western Contra Costa Transit Authority (WCCTA), the Eastern Contra Costa Transit Authority (ECCTA), and the Livermore/Amador Valley Transit Authority (LAVTA) provide dial-a-ride type services to the transit dependent. These smaller transit agencies do not coordinate their services to allow easy travel through more than one service area.

The City of San Francisco

In the early 1980s, about 1.7 million square feet of office space per year was developed. The City Planning Department expects to see significant development within the city in the future, especially in the downtown areas of C3 and Mission Bay. There are indications that the demand for downtown office space has declined; rents are currently about \$24 to \$28 per square foot, down from a high of about \$40 per square foot in 1981. The vacancy rate is still much lower than that in suburban areas--about 14 percent compared to 20 to 30 percent. In 1986, Proposition M limited citywide growth to 475,000 square feet per year for the following 10 to 13 years. This was a 50 percent reduction from the 950,000 square feet limit imposed in October 1985 by the Downtown Plan ordinance.

San Francisco zoning requires office space to be in the downtown area on the east side of the city. The heart of the CBD is an area designated "C3" by San Francisco City Planning. The west side of San Francisco is generally residential and retail uses. Annually, 2.4 million tourists visit San Francisco. Many of the major tourist attractions such as Chinatown, Fisherman's Wharf, and the cable cars are in or near the CBD. This increases the level of retail activity over what might otherwise have existed.

The large amount of tourists filling the cable cars to capacity and the relatively high fares make it difficult to measure the usage of the cable car system as a downtown worker circulator service. From September 1982 to June 1984, the nineteenth century cable car system was closed for a \$58.5 million rehabilitation project. A private sector campaign raised \$9 million of the \$10.7 million required for the 20 percent local match of UMTA funds. The fund-raising campaign was successful through careful campaign planning, large amounts of publicity, especially from the mayor, and the popularity of the cable cars (U.S. DOT, 1984).

Large scale vehicle access to the San Francisco CBD is limited to four routes: the San Francisco-Oakland Bay Bridge, a toll bridge (18,000 p.m. peak period vehicles); the Golden Gate Bridge (13,700 p.m. peak period vehicles), another toll bridge; U.S. Highway 101 (14,800 p.m. peak period vehicles); and Interstate 280 (9,900 p.m. peak period vehicles). Once the vehicles have entered the CBD, there is little available parking. Cost of auto parking averages about \$16 per day. With the realization that the CBD is already at the automobile saturation point, the City discourages any attempts to increase the capacity of the auto routes into the CBD. There is no parking supply requirement for offices, and there is a policy to limit long-term parking. Parking rates are scaled to discourage commuters. Each hour of parking after the initial four hours is charged at a rate ten times the hourly rate.

The San Francisco CBD is served by five major types of transit: BART; the San Francisco Municipal Railway (MUNI), a light rail system; bus transit agencies, including SamTrans, AC Transit, and Golden Gate Bus Transit; several ferries, including a service operated by the Golden Gate Transit District; and CalTrain, the commuter rail service operated by the state. Rail improvement plans for San Francisco call for an extension of the CalTrain line 1.5 miles north to the Transbay Transit Terminal in the heart of the CBD, and a MUNI turnaround project and an extension of the CBD line south to a CalTrain station.

In 1981, the San Francisco City and County Board of Supervisors enacted the Transit Impact Development Fee Ordinance. This ordinance authorizes the city to collect a one-time fee of up to \$5 per square foot from owners or developers of new downtown office space. The rationale for the fee has been that downtown office development brings additional people into the city whose demand for service creates additional costs for the transit system. The fees are used to provide additional peak period services on MUNI (U.S. DOT, 1986). The ordinance had been challenged in court. During the court proceedings, the funds collected were held in escrow. The city has successfully defended the fee against these challenges, so the funds are starting to be released.

The \$29 million Embarcadero BART station was built in 1969 using \$13.5 million in tax increment financing (TIF) bonds. A TIF District was formed around the station; increases in property tax revenue resulting from increases in property values were used to retire the bonds. The bonds were retired after only 6 years of the planned 15 year lifetime because of the significant increases in property values (U.S. DOT, 1985).

In March 1981, the Office Affordable Housing Production Program (OAHPP) was implemented. A \$5.34 per square foot one-time assessment of new office development is been collected to finance affordable housing citywide. To date, over \$25 million has been collected and spent on about a dozen subsidized housing projects.

Suburban developments in Contra Costa County

The Bishop Ranch Business Park, BR, is a development of Sunset Development Company. In 1988, BR had 13,000 employees and 3,612,012 square feet of office space. Currently, there are five building complexes completed, out of eleven planned. It was developed for the most part after 1980. The major owners in Bishop Ranch are Sunset Development, Toyota Motor Sales, U.S.A., Pacific Bell, Chevron, and Beckman Instruments, Inc.

The San Ramon Valley, which contains Bishop Ranch, was an unincorporated area about 27 miles due east of San Francisco. San Ramon Valley had been planned by Contra Costa County for residential, commercial, and industrial use. The area was a typical suburban community with workers commuting into the large Bay Area cities. The site of Bishop Ranch was originally planned for low-intensity industrial use, but Sunset Development Company saw its value as a major industrial park. After the county approved the development of Bishop Ranch, the City of San Ramon incorporated; the area incorporated did not include Bishop Ranch. This created the special problem of tax revenues going to the county, while the city faced negative traffic impacts. Usually in California, an unincorporated area within a city's LAFCo sphere of influence is annexed by the city prior to development. Bishop Ranch has since been annexed by the city, but the fact that it developed before joining the city caused tension. Stemming from the annexation process, Bishop Ranch has the right to not participate in the traffic reduction ordinance under development by San Ramon; however, the business park has chosen to participate voluntarily. The park is regulated by the Contra Costa County TSM ordinance.

The closest BART station to Bishop Ranch is in Walnut Creek, approximately 11 miles to the north. BART operates a shuttle bus to BR. The shuttle bus does not conveniently serve

most of the buildings within the park. The Bishop Ranch Transportation Centre promotes vanpooling and ridesharing among the employees. The Centre and BART are trying to improve the level of service to BR employees. Sunset Development contracts with O&M, a private operator, to operate luxury shuttle buses to and from the Walnut Creek BART station. These buses are the "luxury" type, with more amenities for commuters. These buses operate at 20 minute intervals.

Walnut Creek is located at the juncture of Interstate 680 and Highway 24 (the major link to Oakland and San Francisco for central Contra Costa County). Currently, over 5.8 million square feet of office space and almost 2.4 million square feet of retail space are located within the 625 acre core of the city. The area within about 1/4-mile of the BART station in central Walnut Creek is known as the Golden Triangle. The Golden Triangle contains almost 2 million square feet of office space. The burden upon the street system induced the Walnut Creek city council to pass a building moratorium tied to congestion (*Measure H: The Walnut Creek Traffic Control Initiative*) in 1985, and a TSM ordinance (*Ordinance No. 1678*) in 1988.

San Jose and the Silicon Valley Golden Triangle

The City of San Jose, in Santa Clara County, encompasses the southwest end of Silicon Valley. Santa Clara County has a 1/2-percent sales tax dedicated to transit. Santa Clara County Transit is currently constructing the 20.6-mile Guadalupe Corridor Light Rail system through the heart of San Jose. The \$420 million system runs approximately north-south, passing through downtown San Jose. County Transit is opening the LRT system to the public as each of three segments is completed. The first 6.5-mile northern segment commenced revenue service in December 1987. The 2.4-mile segment serving downtown and the area immediately to the south opened in June 1988; the opening of the final 11.7 miles will not be completed until 1991, due to the simultaneous construction of the Route 87 freeway. County Transit planners hope that someday the light rail system and BART will connect, as a result of a southward extension of BART from Fremont, a northward extension of the LRT system, or both.

Silicon Valley Golden Triangle. The part of Silicon Valley known as the Golden Triangle, an area of about 4000 acres currently experiencing office development, is located approximately two miles north of the San Jose CBD and is generally bounded by Highway 101, Highway 237, and I-880 (State Hwy. 17). The Guadalupe Corridor Light Rail line runs through the heart of this area; the final southern leg of the LRT system will connect the Golden Triangle with residential areas south of downtown San Jose.

PLEASANTON AND THE HACIENDA BUSINESS PARK

Until 1980, the City of Pleasanton was a typical suburban city, with most work trips emanating from it to larger urban centers. The development of the Hacienda Business Park (HBP) in the early 1980s brought mobility issues to the doorstep of Pleasanton residents. The public/private cooperation which occurred in Pleasanton prevented some of the mobility problems which often are associated with suburban development.

Pleasanton description, history, employment, and land use

Pleasanton is located in central Alameda County, about 32 miles from the San Francisco CBD. The city was originally a farm community, with a significant out-commute. Located at the intersection of two interstates and having an available work force, Pleasanton is attractive to developers (see Figure 4-4). In early 1988, the city had a population of 48,500; twenty years before, the population was about 20,000 (source: interviews with City of Pleasanton staff). Employment in the Pleasanton sphere of influence has grown from 9,090 in 1980 to 18,500 in 1985 (Cervero, June 1987). The Hacienda Business Park, with a current employment of 8,250, is responsible for most of this growth.

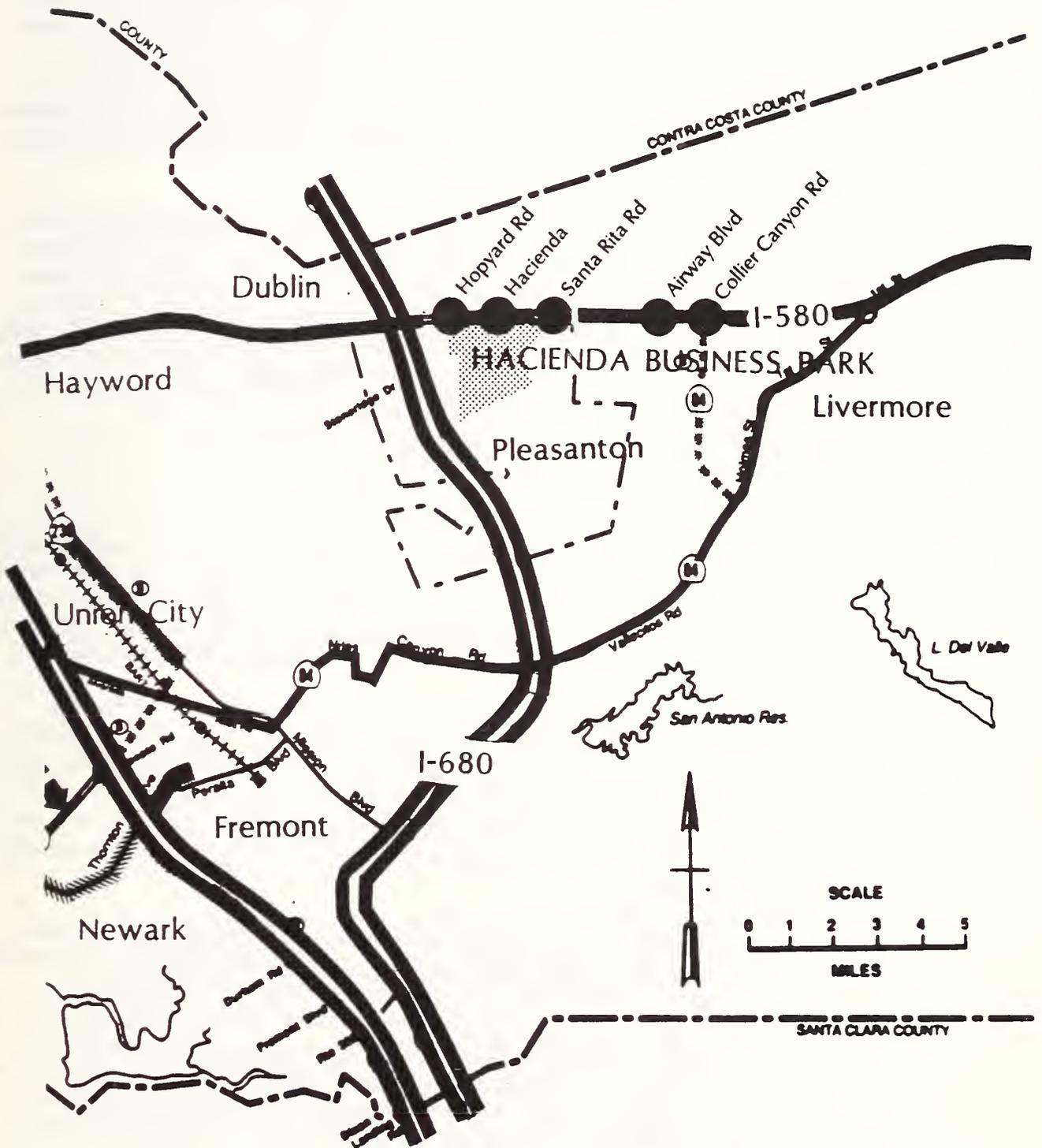
In 1986, over 62 percent of the Pleasanton work force was female. Many employers have located their back office and clerical activities in Pleasanton to take advantage of the work force of women willing to fill lower-paying clerical positions. In 1986, over 42 percent of the employees surveyed were in clerical or service occupations, compared with over 26 percent in managerial and administrative positions and less than 18 percent in professional and technical positions (Cervero, June 1987). By 1988, this distribution had changed to 31 percent in clerical and service, 19 percent in managerial and administrative, and 21 percent in professional and technical (source: City of Pleasanton).

Pleasanton contains several existing and planned business parks. The Pleasanton General Plan restricts business development to only a few regions scattered throughout the city; business parks are in-place or proposed/approved for virtually all of the areas permitting such land usage. The majority of these sites are in north Pleasanton, contiguous to Interstate 580. The Hacienda Business Park is by far the largest and most developed. Between HBP and I-680 are the smaller developments of Meyer Center, Pleasanton Park, Center Park, and Pleasanton Business Park. Meyer Park is the most ambitious of these developments, with 600,000 square feet of space completed and another 650,000 of space planned. To the west of I-680 are Stoneridge Regional Shopping Center, Stoneridge Corporate Plaza, and several other buildings. Stoneridge Regional Shopping Center contains a 1.2 million square foot mall and several surrounding retail, commercial, and office buildings. (Sturgis, Ness, Brunsell & Sperry, 1987).

Hacienda Business Park description and history

Hacienda Business Park is bounded by I-580, Hopyard Road, West Las Positas, Santa Rita Road, and Tassajara Creek. HBP includes 876 acres of land. About 3 million square feet of space has been constructed; plans call for about 12 million gross square feet of office, commercial, and industrial space and a daytime population of 35,000 by the year 2010. Currently, the total employment at the park is about 8,250. Major companies with offices in HBP include AT&T, Hewlett-Packard, Viacom Cable, and Dillingham Construction.

Figure 4-4. Pleasanton and Hacienda Business Park



Source: Metropolitan Transportation Commission

In the late 1970s, Pleasanton had a working population of roughly 20,000 persons, but only 5,000 of those residents worked within Pleasanton. Thus there existed an outcommute of about 15,000 workers to other employment locations in the Bay Area. Hacienda Business Park was developed in order to utilize the availability of workers and the access potential of the two nearby interstate highways. The primary developers, Callahan, Sweeney & O'Brien and The Prudential Development Group, had learned from previous developments of the importance of adequate transportation infrastructure. They packaged the proposal to develop HBP with proposals to create \$140 million in public improvements (Callahan, 1987).

The Hacienda Business Park is characterized by wide boulevards with broad medians and broad building setbacks. Land uses include low- and mid-rise offices, hotels, and high-density residential. Development within the park is regulated by the Design Guidelines. The guidelines call for minimum building setbacks, which are increased by the addition of parking. Observed bus shelters were located next to roads, necessitating a walk of at least the setback distance (*i.e.*, farther than the farthest parking space). The guidelines require preferential parking for carpools and vanpools, and the installation of bicycle racks (P.O.D. Inc., et al., 1987).

Pleasanton travel characteristics

Since the development of the Hacienda Business Park and other office buildings, Pleasanton has become a commuter destination. Most people commuting into Pleasanton travel less than ten miles to work (source: interview with City of Pleasanton staff). The commute into Pleasanton from the San Jose area is usually relatively congestion free on I-680, except during a short peak period. However, the commute from Pleasanton into San Jose is heavily congested.

Traffic congestion is not a problem within Pleasanton. Peak hour congestion is rated by Levels of Service (LOS) "A" through "F" according to the ratio of roadway volume to capacity. The peak level of service (LOS) on most interstates and arterials is at the "B" or "C" levels, with some "A" levels. Most Pleasanton roads have been constructed to meet traffic demands to the year 2020. Improvements to the nearby freeways are expected to keep the LOS at "D" or better.

Peak hour traffic conditions on the two interstates which serve Pleasanton are currently very good. Interstate 580, which runs east-west, is an eight-lane freeway with a capacity of 8000 cars per hour in each direction. The four-lane Interstate 680 (currently being expanded to six lanes) runs north-south, and has a capacity of 4000 vehicles per hour in each direction. On I-580, peak hour LOS are rated "B" or better; the worst peak hour volume on I-580 reaches 5302 cars per hour. On I-680, although most peak hour LOS are rated "B" or better, volume does reach "C" and "D" levels (more than 2,840 and 3,240 vehicles per hour, respectively) just south of Pleasanton at certain peak periods (City of Pleasanton, 1986).

As mandated by Pleasanton's Transportation Systems Management (TSM) ordinance, the Director of Planning and Community Development or his designated representative serves as the Pleasanton Coordinator. The duties of the Pleasanton Coordinator include partici-

pation in the TSM Task Force, organization and collection of data, the review of employer compliance with the ordinance, and participation in regional TSM activities. The TSM ordinance created the Transportation Systems Management (TSM) Task Force, which is responsible for ensuring that traffic levels of service during peak periods on city streets are as congestion free as can be accomplished through implementation of TSM measures. It serves to monitor traffic conditions, coordinate TSM efforts, and mandate revisions to employer and complex TSM programs in order to ensure acceptable traffic conditions (City Council of the City of Pleasanton, 1984).

Produced in July 1983 by TJKM Transportation Consultants, the purpose of the Tri-Valley Transportation Study was to quantify the proposed land use developments within the Tri-Valley and to recommend an appropriate transportation network to serve the valley in the year 2005. The Tri-Valley includes the cities of Pleasanton, Dublin, Livermore, San Ramon, and Danville, and some unincorporated areas in Alameda and Contra Costa counties. The study predicted that with reasonable expansion of the freeway and roadway systems, mobility in the Tri-Valley area would continue to be very good unless all projects under consideration were completely built out. Peak-hour trip reduction factors were examined; the study estimated that 25 percent of peak-hour trips could be shifted through the use of flextime, 10 percent through ridesharing, 5 percent through local transit, and up to 5 percent through commuter rail transit--45 percent in all. The study identified the need to upgrade the interchanges on the interstate freeways and to widen the freeways and major arterials in the region in order to avoid congestion (TJKM Transportation Consultants, 1983).

The Transportation Systems Management Ordinance

The Transportation Systems Management (TSM) Ordinance was adopted by the Pleasanton City Council on October 2 1984 (Ordinance No. 1154). It contained the following purposes and goals:

- To reduce traffic impacts within the city and region by reducing both the number of vehicular trips and total vehicle miles travelled that might otherwise be generated by commuting.
- To reduce peak hour traffic volumes generated by employees permanently working within the city by a minimum of 45 percent through use of employer and commercial/industrial complex developed TSM programs.
 - To maximize the use of commute modes other than the single-occupancy vehicle through cooperative development of citywide programs and means.
 - To minimize the percentage of employees travelling to and from work at the same time and during peak hours (City Council of the City of Pleasanton, 1984).
- To maintain peak hour Levels Of Service (LOS) on city streets and intersections at no worse than LOS "C" for as long a period of time as feasible and to exceed mid-LOS

"D" only after TSM measures have achieved a 45 percent reduction in peak period employee commute trips.

- To preclude peak hour LOS on city streets and intersections from reaching LOS "E".
- To reduce vehicular emissions, energy usage, and ambient noise levels by reducing the number of vehicular trips, total vehicle miles travelled, and traffic congestion.

The ordinance applies to all employers. However, the level of the employers' involvement depends upon its size and location. Nevertheless, all employers regardless of size must respond to the annual transportation survey. This survey gathers information on travel times, commute modes, trip origins and destinations, and information concerning the employer. Medium size employers (10 to 49 employees) not located in a business park or complex must develop an information program to inform employees of commuting options. Large employers (50 or more employees), all employers within complexes, and all complexes must develop and implement a TSM Program designed to achieve a 45 percent reduction in the number of vehicle trips that would occur during the peak periods if the commute trips of all employees were made by single-occupancy vehicle trips during the peak periods. Every large employer and every employer within the complex must have a Workplace Coordinator and every complex must have a Complex Coordinator who is responsible for implementation of the TSM Program at the complex. Those employers in complexes with less than fifty employees may appoint the Complex Coordinator for this task. The Downtown Merchant's Association must appoint a Downtown Coordinator to participate in the TSM Task Force and undertake other TSM duties.

The peak period trip reduction was designed to be phased in over four years--15 percent the first year, followed by 25, 35, and 45 percent reductions in the succeeding years. Employers are not penalized for failure to achieve the mandated trip reductions. However, if the Pleasanton Coordinator and the TSM Task Force determine that an employer's or a complex's TSM Program is not adequate to reduce peak hour trips commensurate with the ordinance goals, that TSM Program must be modified. Stricter trip reduction goals may be required of TSM Programs of individual employers and complexes if the Pleasanton Coordinator and the TSM Task Force find such actions necessary to ensure that any city street or intersection does not reach LOS "E". Failure to provide survey data or to implement acceptable TSM Programs may be punished by fines ranging from \$50 for the first infraction up to \$250 per day for continued non-compliance (City Council of the City of Pleasanton, 1984).

The North Pleasanton Improvement Districts

The North Pleasanton Improvement District (NPID) #2 was formed to continue the financing of previous road improvements and the add \$10 million in additional road improvements. These improvements have created a tremendous amount of excess capacity on the roads serving HBP.

NPID #3 will contribute \$65 million toward four highway interchange projects to improve access to I-580 and I-680. This represents a scaling-back of the original plan for

\$93 million in highway improvements. The properties in the North Pleasanton Improvement District have not been as successful as originally planned due to a glut of office space in California, so the capacity of the landowners to contribute to the highway projects has been reduced. The total cost of these highway projects will be about \$75 million; funding assistance from the federal government or other sources is being sought for the remaining \$10 million. The projects are:

- Stoneridge/I-680. This is currently an ordinary overcrossing which will be become an interchange.
- Hopyard/I-580. A freeway interchange is currently under construction; it will be completed by 1989.
- Hacienda/I-580. This planned interchange is facing problems related to the acquisition of ROW. The ROW is controlled by the cities of Pleasanton and Dublin, Alameda County, and the U.S. Army.
- Santa Rita/I-580. This is an existing interchange which will be improved.

The standard distance between interchanges on interstates is about one mile, and FHWA was reluctant to approve these closer interchanges. This approval was granted for these projects about six months ago, and the environmental documents on the projects were approved in early May. The city expects the business growth to rapidly increase at the next economic upswing, which will make the interchanges vital.

The Hacienda Business Park is the primary property assessed by the two North Pleasanton Improvement Districts. The freeway and roadway improvements should ensure excellent mobility throughout the area of the HBP.

EVALUATION AND DISCUSSION

Private sector involvement

One of the most notable features of the Pleasanton experience is the willingness of the private sector to work with the City of Pleasanton in the creation of the improvement districts and the transportation systems management ordinance. The plans to develop HBP in the early 1980s caused concern among the residents about harm from rapid growth. The city desired the additional tax revenue which business development would provide, but was hesitant about accepting the infrastructure demands and related problems. By taking the initiative in encouraging development-financed traffic mitigation actions, the developers of HBP were able to win community acceptance of the planned 35,000-employee business park and ensure that all future developments shared in the responsibility to mitigate negative traffic impacts.

The City of Pleasanton formed a 150-member citizens advisory committee--the Industrial General Plan Review Committee. The Committee reviewed all potential impacts of devel-

opment, not only transportation. One source of information used by the Committee was the Tri-Valley Transportation Study, which indicated that roughly 45 percent of peak hour trips could be eliminated through local transit, regional transit (BART/LRT), ridesharing, and flextime. Such reductions would allow the travel demand to stay within road capacity. The City feared that if these reducing influences did not occur, traffic congestion could result. After learning about a Sacramento ridesharing ordinance which applied to all new development, the Committee recommended a similar ordinance for Pleasanton which would govern all employers, not just new development.

In October 1984, the city enacted the TSM ordinance. The involvement of developers and employers in the creation of the TSM ordinance allowed consideration of the needs of employers in Pleasanton. As a result, the final ordinance received support from the business community. Had the draft ordinance first developed by the City for discussion purposes been proposed as law, it would have encountered employer opposition. For example, Kaiser Aluminum Chemical, an employer in Pleasanton since the early 1970s, vehemently opposed the first draft; after being involved in the negotiations which created the final ordinance, however, Kaiser became a supporter of the final bill.

Callahan, Sweeney, & O'Brien and the Prudential Development Group, the developers of the Hacienda Business Park, were active and willing participants in the creation of the North Pleasanton Improvement Districts. The developers' past experience in Sunnyvale (in Santa Clara County) demonstrated that a new office park could generate significant negative traffic impacts. These negative impacts led to a citizen referendum which resulted in the re-zoning of some land from profitable office use to less-profitable high-density residential use. Both the developers and the City of Pleasanton wished to avoid such a negative and costly occurrence with HBP. Other reasons for developer desire for such an ordinance include:

- The developers know the value of goodwill within the community. By stopping negative traffic impacts before they started, Callahan and Prudential avoided public backlash.
- These developers also realized that superior roadways serving the Hacienda Business Park and lack of congestion would be a valuable asset.
- By participating in the creation of the ordinance, the HBP developers could ensure that landowners outside the Hacienda Business Park who benefit from the improved roads and lack of congestion would pay a share of the cost of the roadway improvements.

Several developers in Pleasanton have created amenities which encourage the use of commute alternatives, including child care facilities, banks, restaurants/delis, dry cleaners, and recreational facilities.

Lessons and transferability

A city with an atmosphere favorable to development but which has anti-growth ordinances

may find that development occurs just outside its boundaries; thus, the same negative traffic impacts accrue to the city. These ordinances have the additional disadvantage that the new development does not contribute tax revenue which could be used to counteract the traffic costs. Several suburban communities have created ordinances to limit growth, mandate employer actions to limit traffic impacts, and/or assess new developments for infrastructure improvements. Developers in the Bay Area are realizing that such ordinances will be enacted by an increasing number of communities they choose to do business in. Public/private dialogue can make the process easier for all concerned parties.

Several large firms have relocated from San Francisco to suburban employment centers such as Hacienda Business Park and Bishop Ranch. Over time, employees who lived in areas more convenient to San Francisco have moved to live closer to their new Pleasanton worksite, which tends to reduce travel on the roadways. At the same time, the influx of workers tends to increase housing prices in the area of the suburban worksite, forcing some employees to live outside the region and commute long distances. Still, the majority of Pleasanton workers face a work trip of ten miles or less. The high quality of the road network at present reduces the incentive to rideshare. Virtually all Pleasanton firms have used alternative work hours to achieve the required reduction in employee peak hour auto trips; in fact, the rate of ridesharing has decreased in recent years. Employer compliance with the TSM ordinance is spurred by the desire to avoid the negative publicity which would result from violating the ordinance.

Over half of the San Francisco workers commuting from the East Bay area use BART. Without BART, the current roadways and bridges into San Francisco would lack the capacity to support the current high level of development in the San Francisco CBD. However, the BART system has not significantly aided inter-suburban commuters, except for those employed in the high-density office development that has occurred near BART stations.

Suburban communities throughout the Bay Area experienced rapid office development in the early-1980s. The large number of workers living in the suburbs and commuting to the major cities presented an attraction to the suburban developers wanting to capture part of that labor market. Additionally, part of this is the result of Proposition 13, which reduced the residential property tax flow to California counties and cities and thus made those communities more willing to encourage revenue-generating development.

In several cases, the number of employees planned for the new developments is more than 50 percent of the indigenous population of the suburban community. The high cost of housing and land use policies which discourage or do not support the creation of affordable housing tend to encourage job/housing imbalances, as suburban employees cannot afford to live close to their worksites. This has the consequences of limited suburban employment opportunities for lower income workers lacking adequate transportation and increased commute times and congestion on arterials leading to suburban centers.

Developers of suburban activity centers in the Bay Area generally desire to create a low-density, aesthetically-pleasing atmosphere with ample parking. Such center designs are often hostile to transit and pedestrian access. Developers and employers recognize the need to reduce congestion in and around suburban centers, and are willing to participate in plans to reduce peak-hour solo commuting.

The City of San Francisco actively opposes roadway improvements and additional CBD parking which would increase vehicle access to the city, because it is believed that the city is already saturated with vehicles, and that additional vehicles cannot be absorbed adequately by the parking and roadway infrastructure. Thus, transit and increased passengers per vehicle offer the only means to bring new employees into the central business district.

The Bay Area has several unique features which affect the transferability of its experience to other cities. Three major CBD's are within the area; many suburban communities are affiliated with more than one CBD. The BART system has served the Bay Area for about twenty years, enhancing the growth of the San Francisco CBD. The residents of the Bay Area are very concerned about environmental issues; protecting the environment is often a major reason backing programs to reduce congestion. The area is also a very desirable location in which to live and work, contributing to the continued growth of the area. Care would have to be taken to transfer the experiences of this case study to other metropolitan areas.

BWI AIRPORT CENTER, BALTIMORE

CITY AND REGION OVERVIEW

The City of Baltimore, which covers an area of 51,200 acres, has a population of 753,000 (1986). The metropolitan area, which includes Baltimore County, Anne Arundel County, Howard County, Carroll County, and Harford County has a population of 2,253,000 (1986) residents and current employment in the region is 1,159,200. The area is undergoing rapid growth. Since 1980, population increased by 3.6 percent.

There are currently 125,000 employees, and 12 million square feet of office space in downtown Baltimore. The 350-acre downtown has undergone a major revitalization which started in the 1960's with the construction of Charles Center. This revitalization has continued in the 1980's with the Inner Harbor development. The Mass Transit Administration (MTA), which is part of the state DOT, recently opened the Metro (heavy rail) extension to Owings Mills from downtown and construction is scheduled to begin in 1989 on a new extension from Charles Center to John Hopkins Hospital northeast of downtown. This section has received full federal and state funding. The bulk of the \$326 million cost will be funded by the Federal Interstate Transfer Program.

The Transportation Planning Process

The State of Maryland DOT is a multimodal agency with responsibilities for transit, ports, airports and railroads in addition to highways. The MTA operates the transit system in the Baltimore region. The State Aviation Administration owns and operates the Baltimore/Washington International Airport.

The Department financing is provided by the Transportation Trust Fund which combines all transportation related receipts except toll revenues. In 1987, the State passed a significant revenue increase. It consisted of a motor fuel tax increase of 5 cents per gallon, and a 35 percent increase of the vehicle registration tax. The revenue increase will add \$5 billion to the department's capital budget for the next six years (almost a doubling of the budget five years ago). The money will be used for addressing anticipated traffic congestion problems in the suburban growth areas. More specifically, these funds are earmarked for the construction and maintenance of highways and bridges, the BWI Airport, and the Port of Baltimore.

The MTA, in an effort to develop a positive image among suburban commuters, instituted in 1986 a program of expanding transit service in the Baltimore suburban areas. The MTA program has begun new services including: express bus service from suburbs to downtown, reverse commuting, and commuting from suburb to suburb in Baltimore and suburban employment centers in Anne Arundel, Baltimore, Harford and Howard Counties. The program relies heavily on the use of existing and newly constructed park and ride lots, only new buses, and marketing campaign in cooperation with local jurisdictions and major employers. This new service has been provided both through contracts (though not competitively bid) with private operators and with MTA's own operations. Monitoring of operations has shown successful results. All MTA individual routes must, by state mandate, recover 50 percent of operating costs (MD DOT 1988, p. IV-5).

The Regional Planning Council, the local metropolitan planning organization, has been instrumental in initiating and supporting TMOs within employment centers in the region. The RPC has been successful in bringing together public and private interests in the BWI Airport area and the Towson Town Center to meet development-related transportation needs. Efforts are now underway to establish a TMA in the Hunt Valley business center located about 10 miles north of Towson and to promote the TMA concept in other suburban activity centers of the region.

The RPC had previously developed various transportation programs under one central marketing package, the Rush Hour Project, to promote employer-based solutions to traffic and parking problems. Its solutions include employer subsidized transit passes, ridesharing, variable work hours, and parking management. The employer pass program, adopted and promoted by the MTA, is the most successful. The MTA offers monthly transit passes to employers at a discount, provided they at least match that discount to their employees. Over 30 companies are currently participating in the program.

Another example of successful public/private cooperation in financing infrastructure has occurred in Anne Arundel County. The County, in cooperation with area developers, has recently enacted two ordinances that require private contributions for transportation improvements: (1) an Adequacy of Roads ordinance, and (2) an Impact Fee ordinance. Under the Adequacy of Roads ordinance, enacted in 1986, developers are responsible for road improvements or other traffic mitigation measures, such as ridesharing programs, off-site parking facilities, and paratransit in order for existing roads to be capable of accommodating traffic projected to be generated from proposed subdivisions.

Instituted in 1987, the Development Impact Fee ordinance generates funds that provide

capital improvements for public schools and transportation facilities over and above the adequate facilities ordinance. Fees are phased in over a three year period. For 1989, fees have been determined to be \$2,629 per dwelling unit for single family residential (of which \$533 goes for transportation) and \$1,109 (transportation fee) per 1,000 square feet of office space (under 100,000 square feet).

Major Suburban Employment Centers

Four major suburban employment centers are in an active development mode in the region: the BWI Airport Corridor southwest of downtown in Anne Arundel County, Towson and Hunt Valley in Baltimore County, and Columbia in Howard County (see Figure 4-5). The development and accomplishments of the BWI center, the largest suburban center in the Baltimore region, is the main focus of the following discussion.

Towson, the seat of Baltimore County, is the third largest center in the region after downtown Baltimore and the BWI Airport Center. Greater Towson, with a population of over 75,000 and employment of 37,000 is located between the northern boundary of the Baltimore city limits and south of the beltway I-695, close to the intersection with I-83.

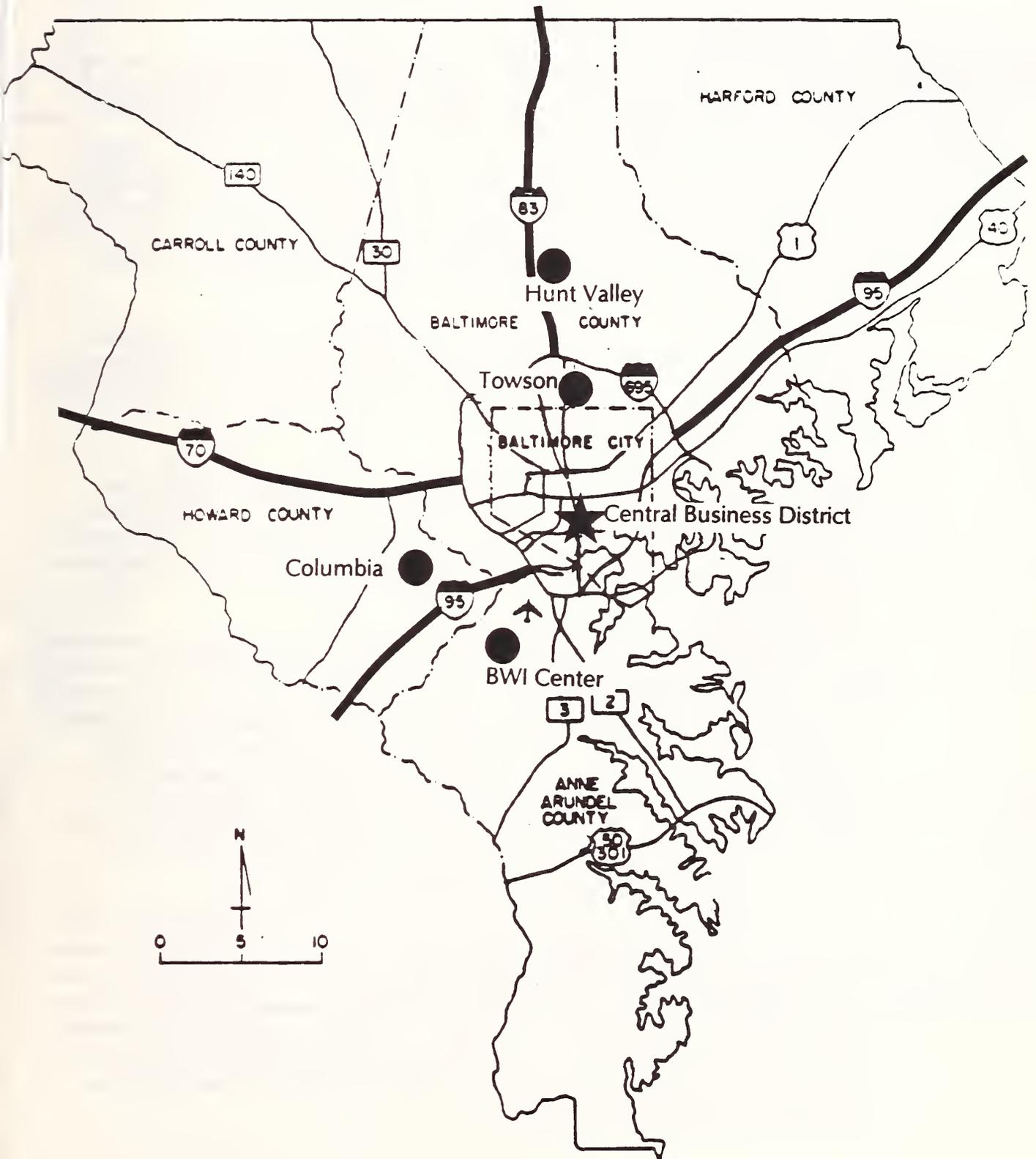
The historic town center has experienced revitalization and economic growth with 1.5 million square feet of commercial and 2.5 million square feet of professional office buildings. A \$100 million planned expansion of its shopping center will make it the largest in the Baltimore region. Towson has developed the highest concentration of senior citizens in the region.

The Towson Development Corporation (TDC), created in 1979, is a non-profit community improvement organization made up of representatives from business, development and institutional entities. The organization has been instrumental in the implementation of the community endorsed and officially adopted Towson Town Center Plan. TDC has pursued legislation and project designs for revitalization, transit, and parking solutions. In 1984, the Towson Transit Management Association (TTMA) was formed under the auspices of the TDC, and the active encouragement of the RPC to address a wide variety of transportation issues. Funded through private and public sources, the TTMA works with the RPC, Baltimore County, and other private and public organizations. The Association is staffed by a part time Executive Director and is sharing office space with the TDC.

The TTMA has contracted with the MTA for the operation of a shuttle bus in the Town Center. A 30-foot bus is operating 3 days/week between 9:30 a.m. and 3:30 p.m. The shuttle originally ran the service 5 days/week. After 2 years of service, private financing seriously decreased which caused the suspension of service in the early part of 1988.

Service has been restored with renewed promises for financial support from the private sector and local government. Under the new arrangement, fares were doubled to 50¢, MTA contributes half, private businesses contribute about one-third of the operating cost, and the remainder comes from Baltimore County (Towson is not an incorporated area). Early attempts to contract out the service to a private operator did not prove successful. The insurance costs were prohibitive.

Figure 4-5. Employment Centers in the Baltimore Region



Hunt Valley is another major industrial center located 17 miles north of the center of Baltimore along I-83 in Baltimore County. The 435-acre Hunt Valley center employs 20,000 workers. Westinghouse has a major industrial facility there. The center includes a 900,000 square feet regional shopping mall.

At this time, Hunt Valley appears to be the site for formalized TMA in the Baltimore region. Several major employers in the area have signed a letter of understanding expressing their commitment to work together in solving critical transportation issues facing the area.

Columbia, located 17 miles southwest of Baltimore between Baltimore and Washington D.C., is one of the new towns planned and privately financed in the early sixties. The developer, Rouse Company, planned the city for an ultimate population of 100,000. Today, Columbia has an employment of 30,200 (1985). The Town Center, which covers an area of 800 acres, has 1.7 million square feet of office space and employs 14,600 workers.

There is a large number of small industrial parks located along Rt 1 close to Columbia between Baltimore and Washington. Ft Meade, a large military installation which employs approximately 30,000 military and civilian employees, is also located just across the border in Anne Arundel County.

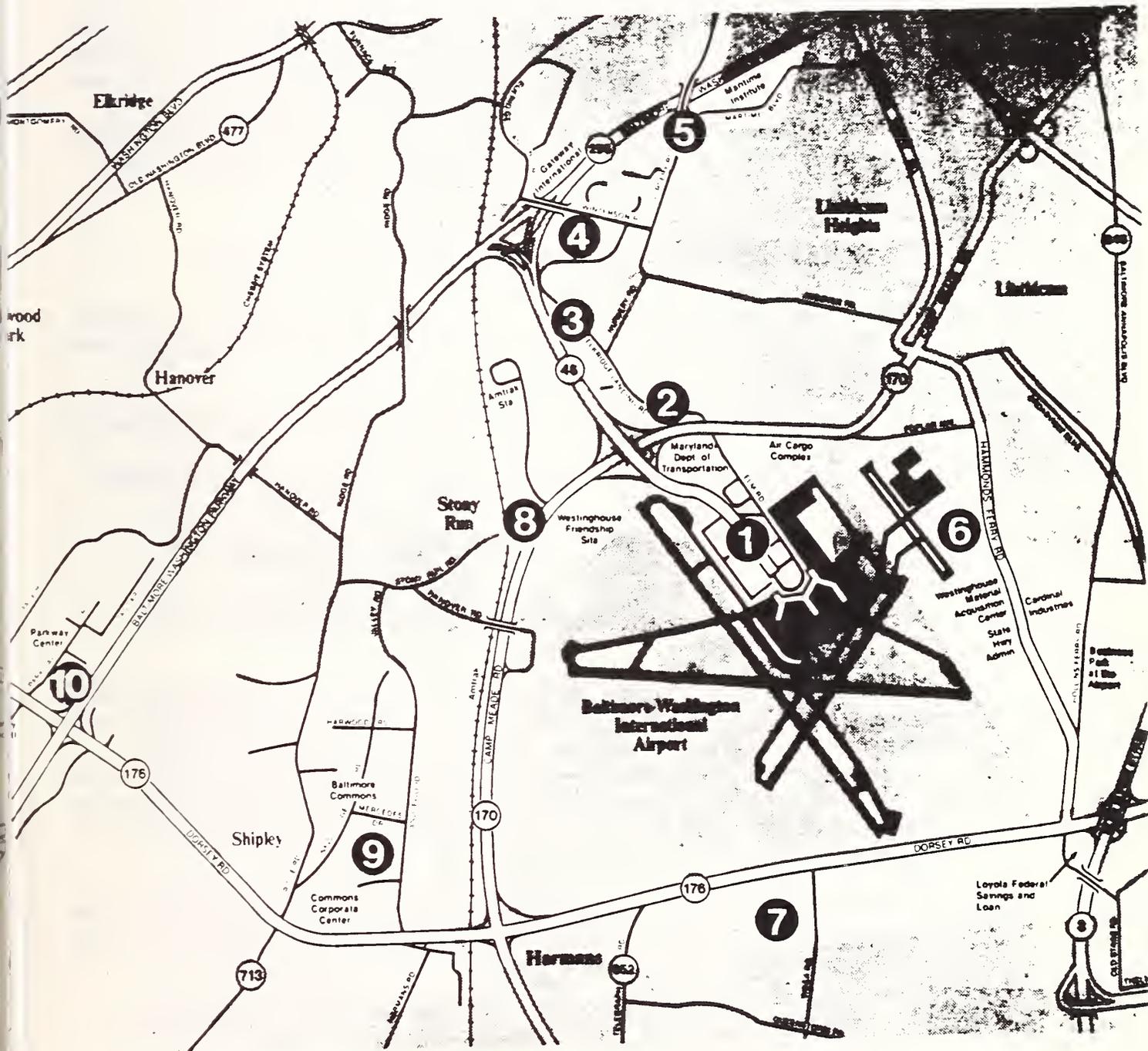
THE BALTIMORE/WASHINGTON INTERNATIONAL AIRPORT CORRIDOR

BWI Airport center covers a 6,400-acre employment area including the airport located in Anne Arundel County 9 miles southeast of downtown Baltimore and 30 miles northeast of Washington D.C.

BWI is the largest airport in Maryland, and the third largest in the Washington-Baltimore region. In 1987, BWI served an estimated 9.2 million passengers. Employment in the area grew from 20,000 in 1980 employment to 35,000 in 1985, and is expected to reach 45,000 to 60,000 employees by 1990. The employment base consists of more than 450 primarily high-tech and R & D airport and defense related companies including Westinghouse Defense and Electronics Center, which employs approximately 14,500 workers, and a branch of the National Security Agency (NSA). These businesses are distributed in a number of industrial parks surrounding the airport, along highway MD-176 -- Dorsey Rd, and the I-295 -- the Baltimore-Washington Parkway. The area is served by Amtrak's commuter rail service, as well as bus transit (See Figure 4-6).

There is currently 6.1 million square feet of office space in the center. Office rents in the area are in the neighborhood of \$17 per square feet. There is no housing available in the immediate vicinity because of the airport, but Anne Arundel County provides ample affordable housing for area employees. Average commuting time for employees is 22 minutes and the average commuting distance is 10 miles. The BWI Airport area is an automobile oriented activity center, with a dispersed building spacing layout which restricts pedestrian mobility. Sixty-nine percent of commuters to the area drive alone. About half of the workers are on staggered work hours.

Figure 4-6. Baltimore/Washington International Airport Corridor



The Airport Area Transportation Collaborative

Anticipated increased congestion in the area prompted the Regional Planning Council in 1983 to initiate the formation of an informal steering committee called the Airport Area Transportation Collaborative (ATCo) to review employment growth trends, to identify overall transportation needs, and to develop solutions to meet those needs. This collaborative was composed of airport-area developers, major employers, state and county government representatives, and both public and private transportation providers. The committee commissioned extensive surveys, and labor market analysis of the area employers identified two key issues: rapid employment growth could increase traffic congestion, and limited public funding available for infrastructure improvements.

The Greater BWI Commuter Transportation Center

After two years of operation, this informal organization was provided greater structure by forming a private non-profit corporation, the Greater BWI Commuter Transportation Center (CTC) was established. The Center's initial objectives included:

- improving labor market accessibility using existing commuter rail and transit services,
- improving internal mobility by operating a cooperative shuttle bus and other para-transit services,
- improving coordination of public/private development interests, and
- serving as a central voice for promoting development-related transportation improvements.

The CTC annual budget is \$155,000 (FY 1988) with half of the funding provided by the private sector sources, and the other half from state and county agencies. One source during the last fiscal year was the State oil overcharge trust fund, which provided a grant in exchange for work identifying energy savings accrued from ridesharing, etc. The Center has a full time executive director and a second part time employee. During the last three years, the Center's membership has increased to include businesses representing two-thirds of the area's employment.

The CTC has pursued a variety of transportation system management techniques such as promoting variable work hours, ridesharing policies, and parking management. In addition it has brokered services for the business community such as:

- working with the MTA, employers and developers in initiating new suburban bus service from Baltimore City to the BWI area (The farebox recovery ratio for this service is 27 percent);
- encouraging hotels in the area to use their own in-house vans to transport their workers back and forth to Baltimore City;
- negotiating with Westinghouse to have the company shuttle transport employees to

the Amtrak commuter rail station;

- serving as a central information clearinghouse for employees, and the local government concerning ridesharing, bus and rail schedules, and construction update service for motorists by means of a monthly newsletter, the Commuter Exchange. During 1987, 3,366 calls were received by the Center from employees for commuter assistance. Seven thousand six hundred trips were taken off the road through ridesharing;
- offering a transportation audit service to employers; and
- establishing working relationships with the Airport area business community, and public agencies, and initiated a strategic planning process to develop a balanced transportation plan for the BWI area (Zissler 1988).

Major Highway and Transit Proposed Improvements

The most recent increase in the State gas tax has significantly increased the revenues available for highway and transit improvements in the area. MDOT is currently planning roadway improvements in a 3-mile area around the BWI Airport which will cost almost \$1 billion. The County cooperated with the State in expediting the implementation of key projects by putting money up front and being reimbursed by the State. Employers and developers are paying for specific improvements through impact fees, complying with the County's Adequate Facilities ordinance, subsidizing commute alternatives, and volunteering staff time to administer in-house transportation programs. Westinghouse and NSA are providing shuttle services for their employees within the center.

MTA has proposed a 27-mile Light Rail Transit line that would connect the airport area with other major employment centers in the Baltimore Central Corridor, including the Hunt Valley business center, and Timonium in northern Baltimore County, the downtown, and the southern terminus at Glen Burnie. The line is proposed to utilize existing railroad right-of-way. Capital costs of the relatively simple at-grade facility are estimated at approximately \$290 million. The State of Maryland is contributing over 70 percent of the costs. Local governments, for the first time in the Baltimore region, have been asked, and agreed to contribute 15 percent of the capital cost. The MTA has announced a solicitation of interest for private sector financial involvement in the Central Corridor LRT project in an effort to reduce the net capital cost and create revenues to help defray either the capital or the operating costs of the system. Proposals could include air-rights leasing and joint development on state owned land and right-of-way. The Maryland General Assembly has approved the beginning of work on the project, and allocated \$10 million for preliminary design study.

EVALUATION AND DISCUSSION

Early actions by employers and public agencies have been successful in preventing traffic congestion anticipated by rapid growth in the area. So far, the Greater BWI Commuter Transportation Center has been very successful in accomplishing most of its original objec-

tives, including improving coordination of public/private interests, promoting development-related transportation improvements, and serving as a central information clearinghouse for commuters. The success has been attributed to the following factors:

- there has been agreement by the business community and public agencies, that the area should manage traffic congestion and initiate new transportation services.
- there has been willingness to commit financial resources to this effort.
- the appropriate individuals from the business community and highly qualified professionals were involved in organizing and administering the CTC programs from the start.
- the transportation management association has avoided classic turf struggles that often plague public transportation agencies.

The CTC has delayed accomplishing one of its original objectives that of developing a shuttle service to transport employees internally. Interrelated activities are dispersed at various industrial park sites around the airport making mobility between those locations problematic. Primarily for security, liability and quality of service reasons, major employers, like Westinghouse and NSA, prefer to run private shuttles limited to their own employees. The airport also runs a shuttle from the terminal to remote parking lots. The Board of Directors voted previously to delay, or table, action on an areawide circulator shuttle system until the light rail planning process began. Now, a study is being initiated to plan an areawide feeder system and/or shuttle which could connect light rail stations with area worksites.

A second objective had to do with the promotion of vanpooling. That program never gained much popularity in the BWI center because most employers live within 25 miles of their worksite. For example, the BWI Corridor office of Westinghouse, even though it employs the largest number of workers in the center, has disbanded a vanpooling program because of lack of interest by employees as opposed to the Hunt Valley division of the same company which has been much more interested in forming vanpools.

The Baltimore region has been privileged to possess innovative agencies which have shown responsiveness to suburban mobility needs. Both the MTA and the RPC have adopted programs and worked constructively with the employers and area organizations. The MTA has instituted a successful suburban bus service program. The RPC was instrumental in initiating the formation of the original steering committee, conducting the original studies, and providing technical assistance and support through the early stages of the TMA. It provided a forum where employers could communicate to the public agencies regarding their transportation concerns.

Private sector involvement

Area counties and the State have recently assumed significant private sector initiatives in the planning and financing of transportation services and facilities, and there is a high

probability that there will be greater involvement in the future. Following are some examples.

1. The MTA has solicited proposals from developers, financiers and suppliers/manufacturers of equipment for cooperative financial agreements to assist in the development of the Central Corridor light rail line project. Baltimore County intends to develop the capability of examining a variety of public/private financing techniques to pay for needed transportation system improvements.
2. MTA currently contracts out some of the newly established suburban bus services and intends to increase that practice. However, these contracts are not competitively bid. For the most part, the private operators who were providing these services went out of business. Subsequently, the MTA came in and offered a subsidy, lower out-of-pocket costs to the operators, and provided extra service. MTA plans to put its first service under competitive bid soon.
3. In the Towson Town Center, the local business community is subsidizing the operation of a bus shuttle system through contributions to the Towson TMA.
4. Anne Arundel County has recently enacted two ordinances that require private contributions for transportation improvements.

Lessons and transferability

There are certain aspects of this case which are unique to Baltimore and Maryland. The MDOT is a multimodal agency. In addition to building and maintaining the state highway system, it is responsible for planning and operating the local transit system, and owns and operates the BWI airport. MTA has solid financial backing by the state and ability to move quickly on high priority projects for implementation. In addition, it is in a position to effectively coordinate the various transportation projects. By state mandate, MTA routes must meet the efficiency criterion of covering more than 50 percent of operating costs through farebox revenues.

The governor is especially interested in, and knowledgeable about the problems of this area since he had served for many years as mayor of the city of Baltimore. He took special interest and assigned high priority to the Central Corridor LRT project. The effectiveness of the State in dealing with suburban congestion may also be attributed to the small size of the State.

The primary lessons from the BWI Commuter Assistance Center are related to the steps necessary for building an effective organization:

1. Start the organization with people who have vested interests to improve access. Such persons must assume leadership position and contribute their time freely.
2. A fair and equitable sharing of the financial burden among members is imperative.

3. Hire capable staff to conduct studies and administer programs which are responsive to the membership's needs.
4. Work in close cooperation with public agencies for service and financial support. UMTA technical assistance grants were instrumental in getting the BWI CTC and the Towson TMA started.
5. Expand the organization to include all interested parties. Inform them about the benefits of organizing.

PARKWAY CENTER, DALLAS

This chapter focuses on the urban planning and transportation issues affecting the Dallas Parkway Center (PC), the largest suburban employment center in the Dallas area and one of the largest in the country. To introduce the case study, the chapter begins with an overview of the Dallas area. Following a description of the Dallas Parkway Center itself, the chapter concludes by describing lessons that can be learned by other cities from the PC's experience.

CITY AND REGION OVERVIEW

Coping with suburban mobility issues in the Dallas area is of primary concern since a large percentage of the population lives and works outside of the City of Dallas. Although Dallas itself has a population of 960,850, an additional 1.5 million live in the suburbs that surround it (NCTCOG, 1988). In other words, The Dallas primary metropolitan statistical area (PMSA) has a population of 2,482,350, sixty-one percent of whom live in the suburbs (NCTCOG, 1988).

Dallas and Fort Worth create a dual hub for the area, referred to as the Metroplex. As with the Dallas PMSA, the majority of the Metroplex residents live outside both Dallas and Fort Worth. More precisely, sixty-four percent of the Metroplex's population of 3.7 million live outside both Dallas and Fort Worth.

Since 1960 the trend toward suburbanization in the Dallas area has increased steadily. In 1960, sixty-one percent of the population of the Dallas PMSA lived in the City of Dallas. By 1970 the percentage dropped to 54 percent. As of 1980 forty-six percent of the population of the Dallas PMSA lived in the City of Dallas. Finally, by 1988 the percentage of the population living in Dallas has dropped to the 38 percent quoted above (NCTCOG, 1988).

The increasingly suburban character of the Dallas PMSA stems primarily from growth rather than outmigration from the City. The population of the City over the last 28 years has increased by approximately 40 percent. In contrast, however, the suburban population has increased by approximately 170 percent (NCTCOG, 1988).

The combination of the tremendous rate of growth of the suburban areas, the concentration of growth in the northern suburbs, and the size of the region have contributed to a

dramatic increase in the vehicle miles traveled. (The Dallas PMSA covers 4,497 square miles.) Between 1980 and 1986 when Dallas County grew by an annual rate of 4 percent, the vehicle miles traveled increased by 35 percent.

The economy of the Metroplex is well diversified in both services and manufacturing. A sizeable portion of its manufacturing base centers around defense and defense-related activities. In addition, a significant and growing part of the manufacturing base is in high-tech electronic industries.

In the midst of this overall growth, however, the economy of the Metroplex has slumped twice. The first slump occurred during the 1982 recession. The second one began in 1986. The Metroplex's economy rebounded quickly from the 1982 recession. The North Central Texas Council of Governments (NCTCOG, 1988) attributes the area's speedy recovery to the diversity of its regional economy and the pro-growth attitude of its business and political leaders.

The effects of the second recession, however, have been more pervasive and the area's recovery has been slower. NCTCOG (1987) has identified two reasons for the CMSAs poor economic performance during the late 1980s. First, it believes the slump is a secondary result of the oil price collapse of the mid 1980s. Secondly, the NCTCOG cites an overbuilt real estate industry as a contributing factor to the recession.

While some blame the overbuilt real estate industry on the oil price collapse as well, NCTCOG (1988) suggests that the oil price collapse is only partially responsible. There is substantial evidence that the tax incentives of the early eighties, a deregulated savings and loan industry, a strong dollar and associated heavy foreign investment, all influenced a building boom which did not heed the early warnings that the market was overbuilt.

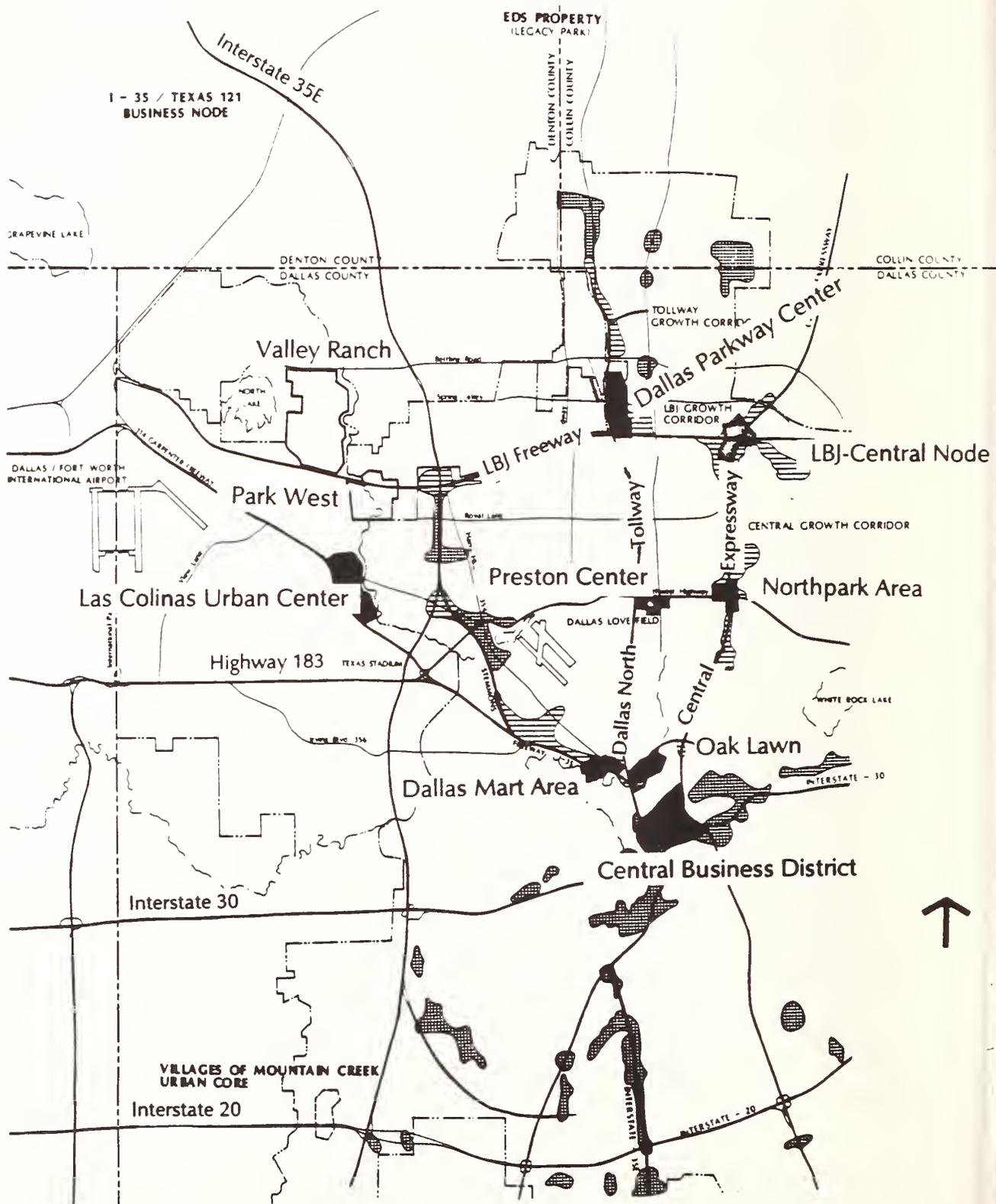
The NCTCOG predicts that the long-term growth prospects for the Metroplex are favorable, although it will be at a slower rate than what occurred in the 1970s and early 1980s. It projects that the population will increase from its 1986 level of 3.6 million to 5 million in the year 2010, an increase of 40 percent. Further, NCTCOG forecasts employment will increase from just under 2 million jobs in 1986 to over 3 million in 2010, an increase of 52 percent (NCTCOG, 1988).

The Transportation Planning Process

The Metroplex's dual focus on Dallas and Fort Worth has resulted in a highway system which provides an interconnected double hub of radial and loop freeways as well as a connection between Dallas and Fort Worth. Radial access to Dallas is available through Interstates 35, 45, 20, and 30. Other radial thoroughfares which converge on Dallas include: US 75, US 67, and the Dallas Tollway. Interstate 635 (also referred to as the LBJ Expressway) and Texas Highway 12 provide circumferential routes around Dallas (Rice Center, 1986) (see Figure 4-7).

An extensive network of arterial roads also serve the Dallas PMSA. However, the usefulness of this network is limited since the grid is incomplete. These roads pass through a number of jurisdictions, and intense controversy surrounds which roads should become major thoroughfares. Some communities, desiring to divert traffic from passing through

Figure 4-7. Employment Center in the Dallas Area



Source: Parkway Center Project

them, refuse to widen roads that are major thoroughfares on either side of their jurisdiction. The arguments on both sides of the issue are understandable; nevertheless, the stalemate inhibits regional transportation planning.

The Dallas PMSA is heavily dependent on automobiles for meeting its transportation needs. Therefore, having adequate roads are a critical part of meeting the area's transportation needs. Traditionally, providing roads has been the responsibility of a select group of public sector agencies. For the Dallas PMSA, the government entities chiefly involved in building roads include; various municipalities, Dallas County, the Texas State Department of Highways and Public Transportation (SDHPT), and the Texas Turnpike Authority.

Each agency has its own particular focus. The City of Dallas DOT is responsible for thoroughfare planning and development within the city limits. Dallas County, on the other hand, is concerned with roads of county-wide importance. As a general rule, it funds construction of roads outside of municipal jurisdictions. However, the county does sometimes share the costs of constructing roads within city limits. Finally, the SDHPT is primarily concerned with the State Highway System. It oversees facilities with Interstate, U.S. Primary, State Highway (SH) and Farm-to-Market (FM) designations.

In the early 1980s these public agencies could not keep up with the demand for increased roadway capacity. There was an intense public outcry over the traffic congestion in the Dallas area. It became very apparent that there was a need for innovative transportation planning and financing.

The public outcry on the traffic problem indirectly led to the formation of the Metroplex Mayor's Committee (MMC). More precisely, however, the sequence of events began with the Dallas Chamber of Commerce's leadership in pioneering a regional mobility planning effort for Dallas in 1983 and its participation in the 1986 update of The Greater Dallas Mobility Study. As a result of the Greater Dallas Mobility Study, private sector community leaders encouraged the formation of the Metroplex Mayor's Committee (MMC). Since then, the MMC has met monthly to discuss transportation issues of common interest (telephone interview with Steve Lockwood).

Another group involved in area transportation planning is the Regional Transportation Council (RTC). The RTC prepares and maintains a regional, multimodal transportation plan for North Central Texas. It is composed of elected officials, many of whom are also involved in private sector businesses. In conformity with the UMTA policy for private enterprise participation in transportation planning, private sector leaders in urban development and private transportation operators have been working with the RTC in formulating transportation plans and programs for North Central Texas. Its members are served by the NCTCOG staff.

The North Central Texas Council of Governments, has served as the Metropolitan Planning Organization (MPO) since 1974. NCTCOG provides technical assistance to the local governments of North Central Texas in preparing population and employment forecasts, transportation modeling, planning, coordinating, and helping to implement transportation decisions (NCTCOG 1984). In addition, NCTCOG records the transportation plans for other agencies on an area map (Lockwood, 1988). Finally,

NCTCOG and SDHPT's Regional Transportation Study Office collaborate with other agencies, jurisdictions, and private sector participants to prepare the annual Unified Planning Work Program (UPWP) and the Transportation Improvement Plan (TIP) (Rice Center, 1986).

The City of Dallas has sought private participation in transportation planning. One such example involves the North Central Corridor. Because of the degree of traffic congestion, SDHPT's initial recommendation for the corridor was to double deck the expressway. The proposal met strong opposition by the City of Dallas and the private sector. As a consequence, Dallas and DART formed a special private sector and community task force to study alternatives for the North Central Expressway Corridor. The task force worked in cooperation with a 45-member advisory committee, several cities, and governmental agencies responsible for transportation.

The North Central Expressway Task Force Report recommended that the Central Expressway be widened to eight lanes, that the distance between exits increased to improve the flow of traffic, and that the proposed DART rail route be depressed below the expressway. The Task Force's Report was approved and the plans are in the final engineering stage. Nevertheless, negotiations between private sector and the City over private sector contributions of right-of-way are continuing (City of Dallas, undated).

In the area of financing new roadways, one of the solutions sought by the mayor of Dallas and the surrounding suburbs was to form the Executive Committee on Highway Finance (ECHF) in 1985. The ECHF is a five-member task force charged with lobbying SDHPT for a greater share of State highway funds for the Dallas region.

A second strategy to provide more funding for roads has come from soliciting private sector contributions. The Dallas Chamber of Commerce has spearheaded some of this private sector involvement. The Chamber has facilitated aspects of the land donations the private sector has given for freeways.

The City of Dallas, and some of its suburban neighbors, have also taken leadership in securing private sector contributions. These jurisdictions have required that private developers perform traffic impact assessments for major proposed development projects. Based on this analysis, certain on-site, adjacent-to-site, and off-site improvements are required from the developer before zoning changes or building permits are granted. The DOT also is involved in working with developers who are required to prepare traffic impact analyses prior to receiving zoning on projects generating in excess of 1,000 trips per day or prior to receiving building permits for projects with floor area ratios greater than 1:1 and generating more than 6,000 trips per day and 500 trips per acre (Rice Center, 1986).

Almost every new facility built since 1980 has had some private sector contribution. In addition, the City was also testing mandatory traffic impact fees based on total project floor area. However, the requirement for these fees has been suspended until the City's thoroughfare revision plan is completed.

The City of Dallas' thoroughfare revision plan enables reevaluating the functional classifications of all the thoroughfares. The roads will be designated as arterials, collectors or

locals. The purpose for classifying the roads in this way is to define an enforceable legal definition of what the road is to be. After these road classifications are in place, the City of Dallas plans to require that developers desiring to put in buildings that exceed the prescribed traffic impact to pay for road improvements.

The Dallas Area Rapid Transit, DART, provides bus service to 16 of the 34 cities in Dallas County. These cities created DART by passing a referendum to join the regional transportation organization in 1983. By passing the referendum these cities agreed to pay a one percent sales tax to support DART in exchange for receiving bus service and eventually a rail system.

The institutional arrangement under which DART has provided bus services has changed over the years. Initially, DART's directors competitively contracted for bus services from both private providers as well as the Dallas Transit System (DTS), a public provider. However, from the time that the DART referendum passed, the agency has been negotiating to buy or take over DTS. The two agencies completed their negotiations in 1988 and DART officially took over DTS' operations. Even though since that time DART has used DTS for most of its fixed route operations, DART continues to contract with Greyhound/Trailways for some of its suburban operations.

Between 1983 and June 1988 DART concentrated its long-range planning efforts on developing a rail system. The original proposal, approved in 1983, involved 147 miles of rail, financed from the sales tax revenue it received and on a "pay-as-you-go" basis. They chose this approach since the DART board did not want to incur long-term debt or receive federal aid to build the system. As time progressed and the economic climate changed, however, DART discovered its cost estimates were low and its revenue estimates were high. By 1988 it became apparent that if DART were to provide rail service in the near future both long-term debt and federal aid would have to be used. Even though DART altered its rail service plan to 93 miles of rail, the estimated cost was \$2.9 billion (Mintz, 1988).

Without the borrowing authority that the referendum would have allowed, DART estimated that it would have to delay construction of the rail system for five years. DART pushed forward with the elections since it believed that a number of suburbs would consider such a delay unacceptable. At the same time, the strongest opposition came from the suburbs of Garland, Irving, and Richardson.

In June 1988, voters defeated a DART bond proposal that would have allowed DART to incur long-term debt toward the construction costs of building the rail system. Sixteen percent of the registered voters turned out. Fifty-eight percent of whom voted against the referendum and 42 percent supported it. The fact that voters were only voting on a single issue and the election was held during a summer weekend may have reduced voter turnout.

The year 1988 will be a crucial one in determining the future of DART. Several analysts believe that the voter's rejection was as much a vote of "no-confidence" in the DART board as it was a rejection of the rail line itself (Kain, 1988). Critics of DART complain that the organization is wasteful and unresponsive to its constituents.

The proposed rail system was the primary incentive for many of the suburbs in the DART system. Without the prospect of a rail system or other alternative service, many fear that the suburbs will pull out of DART. If they do so, DART's operating budget would be significantly reduced. While this situation is critical, the agreement the suburbs have with DART prevent them from making a hasty decision since in order for the suburbs to leave DART they must ask for a recall vote. Further, it takes one year between when the vote is asked for and when the election can be held. This gives DART at least a year to work on a new plan for promoting regional mobility before possibly losing the suburbs.

In August 1988, the DART Policy Board developed guidelines for a new DART system plan. Pending modification from community input, these guidelines form the parameters for alternative service options. The work program lists a number of "Early Action Candidate Projects." The immediate (less than two year) category includes such paratransit services as vans, small buses, and demand responsive service. The immediate category also includes transportation system management (TSM) projects such as additional CBD and arterial bus-only lanes, bus bypass ramps, and signal preemption. In the intermediate (two to five year) category are high occupancy vehicle (HOV) lanes for IH-30, IH-35E, IH-635(LBJ), 183 and 114. In addition, the intermediate goals include consideration of transitways that are convertible from bus to rail and a commuter rail line demonstration.

The guidelines for the new DART Service Plan promise to have a greater impact on the Parkway Center (PC) than implementing the light-rail system would have. The line segment of the DART rail system extending to the PC was unfunded for the first phase. On the other hand, if DART builds an HOV lane on the LBJ Freeway, the PC would directly benefit.

Building HOV lanes are included in DART's intermediate goals because of a major study performed by a collaborative effort between DART and SDHPT. SDHPT is participating in this program since it has a small public transit fund which is available to match two-thirds of the local share of UMTA grants to transit agency contributions.

Nevertheless, involvement in building HOV lanes is a relatively new role for SDHPT. Moreover, DART has never attempted such a project before. The HOV lanes built by SDHPT and METRO in Houston have served as a model for what is possible in Dallas.

Major Employment Centers

Employment in the Dallas PMSA is scattered among a number of municipalities. During the economic downturn of the late 1980s, the municipalities have become competitive with one another for development. Throughout the 1980s, the City of Dallas has maintained a stable share of the Metroplex's employment. As of 1980, 48 percent of the employment in the Metroplex was in the City of Dallas (NCTCOG, 1988). It declined two percentage points to 46 percent in the next six years.

The NCTCOG speculates that the share of the region's employment located in Dallas will continue to decline over the next ten years, but only by approximately three to six percentage points. By 2000, NCTCOG predicts that Dallas' share of the regional employment will be between 40-43 percent.

The City of Dallas has retained a significant portion of the region's employment through the existence of "suburban" employment centers within the city limits. In addition to the Dallas CBD, employment centers within the city limits include: The Stemmons Freeway corridor, Park Central, the Northpark Area, Oak Lawn, and a portion of the Parkway Center (PC). There are also a number of employment centers in the surrounding communities. Las Colinas in Irving, EDS in Plano, and the Farmer's Branch and Addison portions of the PC are identifiable employment centers outside of the City of Dallas.

Not only are the municipalities competitive with one another for development, the employment centers themselves are also in competition with one another. This competition largely comes from the private sector, since they are directly concerned about property values and occupancy rates. Nevertheless, since a center's growth also affects such issues as tax revenues and the local employment rate, the municipalities are also concerned with competition between the centers.

The Dallas CBD - The Dallas CBD represents a sizeable share of land, commercial development, and employment within the PMSA. In 1988, 117,000 are employed in the CBD. The CBD encompasses 900 acres and includes 57.8 million square feet of non-residential floor space. Cushman and Wakefield classify 31.1 million of this non-residential floor space as "rentable" commercial space, distinguishing it from owner-occupied space. This rentable square footage accounts for 24 percent of the "rentable" commercial space in the Dallas PMSA.

The CBD has held its own in comparison with the other employment centers in the Dallas area. The average occupancy rate throughout the PMSA is 71 percent while in the CBD it is 75 percent. Furthermore, the average rent per square foot is \$14.34 throughout the PMSA and \$15.77 in the CBD.

Oak Lawn - The Oak Lawn employment center, an area of Dallas northwest and immediately adjacent to the downtown, encompasses a broad spectrum of residential neighborhoods as well as a diversity of commercial interests. It is a transition area between the commercial downtown and the exclusive residential communities of Highland Park and University Park. Rice Center (1986) predicts that the area's employment will grow from 44,000 to 146,000 by the year 2000.

The area's development has brought about a number of growth management and transportation problems to be solved. Finding solutions, however, has been complicated by the presence of both strong residential and commercial interests. Community leaders reached a milestone in 1982 when the private sector formed the Oak Lawn Forum to bring all of the interest groups in the area together to identify problems and achieve a consensus on a plan for the orderly evolution of the area. The plan that the Forum developed addresses such issues as zoning, neighborhood stability, protecting the unique retail environment, landscaping, parking aesthetics, urban design and transportation.

The Forum sought to control traffic congestion while preserving the residential character of the area by advocating roadway and parking limitations with various methods of demand management. The traffic management activities included: increasing the use and availability of public transit through more frequent DART service, establishing an internal shuttle

bus system, building bicycle lanes and a pedestrian system, and encouraging ridesharing, in order to accommodate the area's high density zoning.

North Park - Development of North Park, located at the intersection of Texas Highway 12 and IH-75, began in 1965 with the opening of the North Park Mall. However as of 1988, the employment center encompasses 1.1 million square feet of office space and a bank in addition to the retail shopping mall.

Raymond Nasher has been the primary developer of the North Park Area, owning one of the four quadrants and having long-term leases on two other quadrants at the North Central Expressway and Northwest Highway intersection. The office space is concentrated on one quadrant of the intersection and has an occupancy rate of approximately 85 percent. The southwest quadrant, consisting of approximately 43 acres, is vacant. Nasher is considering several alternate uses for this property, from residential to high-density commercial development.

Even though traffic volumes on both IH-75 and State Highway 12 are high, the developers have not gotten publicly involved in transportation issues since the NCTF recommended an alternative for reconstruction of N.C. Expressway. Demand management strategies have not been developed for Northpark.

Park Central - The employment center, located at the intersection of IH-75 and the LBJ Freeway, encompasses approximately four million square feet of commercial development. The employment center includes 11 office buildings (approximately 80 percent of which are occupied), two hotels, and a shopping village.

Aetna Insurance Company, Park Central's developer, has dealt with traffic congestion by working with state officials to increase roadway capacity. However, they have given little consideration to demand management. The insurance company encouraged the SDHPT to increase the lane capacity on the LBJ Freeway and U.S. 75. Although Park Central is near a Park and Ride facility, the developer has not considered to date any kind of shuttle service to minimize employees need for a car once they get to work.

Las Colinas - Las Colinas is a master-planned, privately funded, community located in Irving between the city of Dallas and the Dallas/Ft. Worth (DFW) Airport. The community covers 12,500 acres. It has 20,000 residents and 50,000 employees. The developer expects the community at full capacity to reach 150,000 employees and 50,000 permanent residents.

The core of this development is a mixed land use urban center. This center encompasses 960 acres of high-density, medium to high-rise commercial and multi-family residential buildings. The urban center incorporates the offices of more than 600 companies, 80 retail shops, 40 restaurants, an equestrian center and film studios. Cushman and Wakefield (1988) estimate that the area has approximately 12 million square feet of rentable non-residential space and has one of the highest occupancy rates for rental property in the Dallas PMSA.

The occupancy rate for Las Colinas is 77 percent. The *Dallas Business Journal* (1988) attributes Las Colinas' success to the abundance of class A nonresidential space it has to

offer. As of 1988, the demand for class A non-residential space is much higher than for other types.

Las Colinas' approach to traffic management is to privately develop a guideway within the urban center with the prospect that eventually it would connect to the proposed DART rail network. Prior to 1984 each property owner built the stretch of guideway that crossed his property.

The guideway will be opened in two phases. Phase I will begin operating in June 1989. The route will cover 1.5 miles and include three stations. Phase II will cover five miles.

THE DALLAS PARKWAY CENTER

The Parkway Center, located approximately ten miles north of downtown Dallas at the intersection of the North Dallas tollway and the LBJ Circumferential Beltway (IH-635), is one of the largest suburban activity centers in the country in terms of office space. The PC consists of 600 acres within the Dallas city limits. It also encompasses an additional 1400 acres in Farmer's Branch and Addison (see Figure 4-8). The area also contains a large residential population of 14,800 dwelling units. within its boundaries.

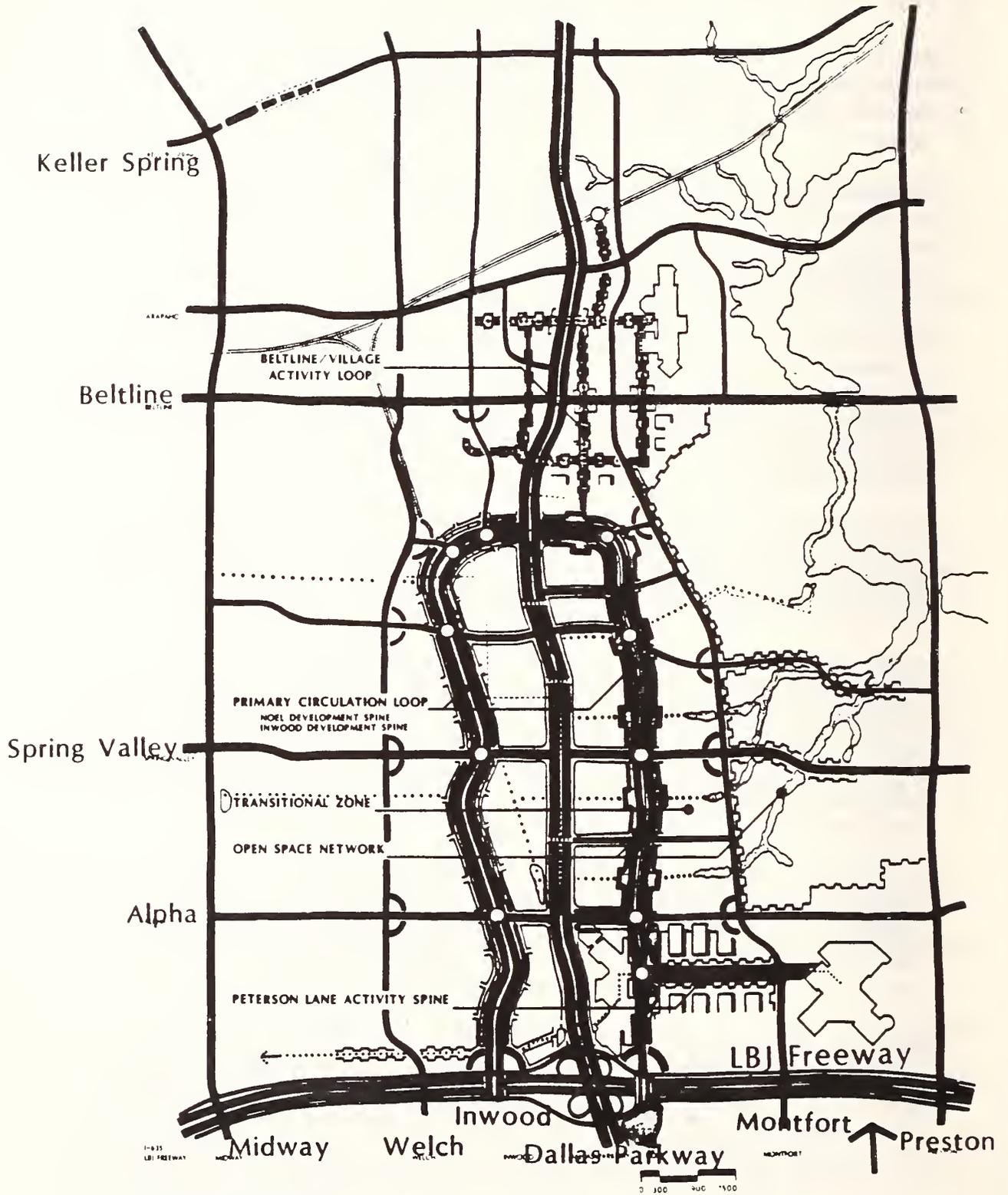
The Parkway Center is also the largest suburban employment center in Dallas outside of the Central Business District. As of 1988, the area contains over 22 million square feet of office space, 3 major retail shopping malls encompassing 7 million square feet of space, and 3,160 hotel rooms. As a result, 59,500 employees work in the PC.

Nearly all of the PC's development has taken place since the early 1970s with the most tremendous boom occurring between the mid 1970s and mid 1980s. The PC had several assets which made it a particularly attractive area to develop. First, it has a strategic, high visibility location at the intersection of two highways and convenient access to DFW Airport. Second, there was a lot of undeveloped relatively cheap land available. Third, the liberal business zoning policies of adjacent Farmers Branch and Addison also facilitated rapid development.

In the late 1970's, the City of Dallas ignored the PC in deference to the CBD. The land owners and the North Dallas Chamber of Commerce persuaded the Texas Turnpike Authority to extend the Dallas Tollway. The Tollway extension opened up access between the PC and downtown which facilitated development. By 1984, the City of Dallas' position had changed and it became interested in promoting the PC's growth.

Unlike typical suburban areas in which retail and restaurant growth follows density of population, in the PC these type of development--particularly restaurant--preceded much of the population growth and other development activity. In addition to the reasons stated above, development was aided by a 1976 referendum in the Town of Addison to legalize the sale of liquor, which placed Addison in the position of being "wet" while the adjoining cities of Dallas and Farmers Branch were still "dry." An Addison ordinance restricting the issuance of mixed drink permits only to establishments in which the primary purpose was food service as opposed to liquor service encouraged restaurant development. Developers attracted to the abundance of restaurants and the large contiguous parcels of undeveloped

Figure 4-8. Parkway Center



Urban Design Plan
Source: Parkway Center Project

land soon followed with retail and office development (Rice Center, 1984).

The City of Dallas' interest in promoting the PC stems from the revenue the Center currently generates as well as the City's desire to maintain its market share of future development. The PC represents the city's most promising means of competing with suburban development. It is the last area within the Dallas city limits containing a large area of undeveloped commercially-zoned land located in a major growth corridor without significant residential adjacency problems. Nevertheless, evidence suggests that developers are beginning to favor sites outside of Dallas for development. If this trend continues, it would adversely affect the City of Dallas' revenue.

Dallas is particularly interested in developing the PC because while the PC comprises less than one percent of the city's land area, it generates approximately five percent of the city's assessed valuation. In addition the PC contributes \$11 million in sales tax receipts, which is approximately 10 percent of the city's total. Finally, the PC's property tax revenues provide \$9.6 million to the general fund and \$3.3 million for debt service.

A number of uncertainties exist which make it difficult to predict the amount of development that will take place in the Parkway Center in the future. However, using zoning rights which the City of Dallas, Addison, and Farmer's Branch have already approved indicates the capacity to which the Parkway Center can grow. As of 1988, the PC could build-out to a total of 80 million square feet of commercial development, including 28 million square feet in the City of Dallas. Under this scenario, businesses in the PC would employ 100,000 employees, approaching the CBD as the major employment Center in the Metroplex.

Several factors may inhibit the PC's development. First, the overall rate of growth in the Metroplex has slowed down; suburban employment centers and the downtown area now find themselves competing among themselves for new prospects. In addition, the *Parkway Center Project Summary* points out several additional problems that may inhibit the growth of the PC. It states, "Existing development lacks the mixed land-use pattern, linkages, and amenities which characterize an efficient and attractive major urban activity center." It further states that, "Transition to a major regional activity center will require a change in approach--away from the suburban project-by-project laissez-faire approach toward the systematic provision of a high level of service and amenities to support an efficient, competitive activity center of infrastructure, services and amenities."

Taking into account the inhibiting factors listed above, consultants for the City of Dallas predict that by 2010 the Parkway Center overall will comprise between 30 to 40 million square feet of commercial development. The 10 msf difference depends on whether a business-as-usual or an aggressive public-private cooperative approach to development is undertaken. This amount of office space represents an increase of 8 to 18 million square feet over its 1988 square footage. Of the prospective development, the consultants estimate that over half will take place within the Dallas portion.

Defining The Mobility Problem

During the early 1980s traffic surrounding the PC became severely congested. The 1986 Greater Dallas Mobility Plan which evaluated traffic congestion on major thoroughfares in the Metroplex concluded that traffic congestion along IH-635 was very serious. The study reported that traffic congestion on IH-635 had increased 121.4 percent between 1981 and 1985.

The primary cause of the severe congestion problem during the early 1980s was a combination of an increased level of non-residential development combined with road construction on the North Dallas Tollway as well as Montfort and Belt Line Roads. Once the road construction was completed, the immediate traffic congestion crisis subsided. Furthermore, the completion of the roads coincided with the end of the rapid growth in Dallas. Nevertheless, other factors are still present which will probably lead to traffic problems in the future. Both public officials and the private sector are anxious about this situation. The additional factors that are threatening the area's mobility include insufficient roadways to handle more development, lack of public transit, and design features of the PC which make it difficult for employees to be without their cars at work.

The PC has less than one-half of the CBD's roadway capacity and almost no transit service. As a means of comparison, the CBD is served by 50 radial freeway lanes, has many arterials, and 30 percent of its employees use some form of transit. The PC, on the other hand, has 26 freeway lanes and has less than two percent of its employees using transit.

Solving the PC's mobility problems, however, is more complicated than merely providing buses or additional travel lanes. Such factors as the absence of sidewalks and bike paths as well as the limited mixed land use discourage employees from pursuing transportation demand management alternatives. Unlike the CBD, employees desiring to shop or go to a restaurant for lunch often find it necessary to have a car.

Mobility Initiatives

The City of Dallas has recognized the PC's mobility problem since 1981. At that time a major planning study recommended "a moratorium on development to allow the public sector to catch up with the burgeoning demands for road improvements." (Reid) This knowledge, however, did not dissuade the city from promoting the PC as a growth center.

The City of Dallas' initial response to the development occurring in the Dallas portion of the PC was to increase the transportation capacity of the major roads. In 1982, following a series of feasibility studies, the Texas Turnpike Authority decided to widen and extend the tollway facility four miles and to add a two mile free feeder road extending to the east. In addition, the Tollway interchange with the LBJ Freeway was expanded to fully directional operation with continuous service roads.

In addition, the city passed a multi-point building setback ordinance and a Transfer of Development Rights (TDR) ordinance to reduce the economic impact on both the public and private sector as well as preserve the right-of-way. (Lockwood, 1986)

In 1984, the public officials called for a special review of the relationship between the new development and transportation capacity. Neighborhood groups and public officials both became alarmed by the numerous petitions for rezoning and building permit requests that were submitted by developers following the announcement of the proposed extension of the North Dallas Tollway. There was a public outcry by neighborhood groups living adjacent to the PC over the potential traffic impact that would result from continued proliferation of commercial development. Consequently, they began exerting political influence on the city officials. City officials themselves, however, recognized that the area lacked a framework for growth which further motivated their decision to act (Canizaro, 1985).

Because of their concern over the transportation issues, in 1985 the City of Dallas and the North Dallas Chamber of Commerce jointly funded a technical study, "The Dallas Parkway Center Land-Use and Transportation Study." The study examined the level of development that both the primary and secondary areas could support given the combined capacity of specific road, transit, and transportation management programs actually implemented as well as the level of congestion that the public would tolerate. The study concluded that the primary area could support 12 million square feet of commercial development using fairly conservative means. However, the study further concluded that the primary area could support the 28 million square feet of nonresidential development, which private developers had already petitioned the city for, as well as the announced 15-20 million square feet of commercial development in Addison and Farmers Branch "if--and only if--extraordinary measures were taken" (Parkway Center Development Program, 1988).

The conservative mobility strategy recommended by the study still necessitated both public and private commitment to remedy the traffic problems. However, the study referred to this approach as a "business as usual" scenario. Under this scenario local government would build recommended streets, DART would implement the proposed DART Service Plan, and the private sector would initiate moderate but coordinated transportation management activities.

The "extraordinary measures" called for to cope with the significant up-zoning, on the other hand, involve a six-point program. These points include:

- establishing an overall development strategy for the Parkway Center that focuses on providing a transportation system that will adequately service denser development.
- developing a capital improvement program that has appropriate amendments to the Regional Thoroughfare Plan which would provide sufficient road improvement projects, set up an implementation time frame, and devise a funding mechanism;
- increasing transit service; specifically, the plan calls for the provision of a regional rail service by DART, and an internal circulator service sponsored jointly by the private sector and DART.
- creating an area-wide Transportation Management Association;
- establishing an urban design program which focuses on land-use mix for the purpose of making the area more attractive and thus more attractive to prospective

businesses as well as establishing a means of traffic-demand management.

- establishing formal and informal means of coordinating development and transportation responses among Addison, Farmers Branch, DART, State agencies, and the private sector (Parkway Center Project Summary Report, 1988).

As a result of the study, the Dallas City Plan Commission and the Dallas City Council decided to follow the aggressive development scenario on the presumption that all the parties concerned would enact the "extraordinary means" necessary to control the traffic congestion and improve the competitiveness of the area. The City passed, almost simultaneously, major transportation initiatives including the 1985 Bond Program which contained almost \$100 million for road construction in North Dallas and an additional \$8 million for traffic signal upgrading and computerization in the area.

In order to safeguard its investments, the City incorporated special land-use and development requirements in zoning applications, through use of Planned Development Districts (PDD). The requirements included scaling allowable built-space to the existing and anticipated transportation capacities, and required the private sector to fund a portion of the transportation improvements.

With the adoption of the PDDs, individual property owners were responsible for:

- dedicating right-of-way and constructing on-site roadway and transit improvements valued in excess of \$75 million;
- paying 50 cents per square foot to fund off-site improvements;
- participating in a TMA and pay 5 cents per square foot to fund it;
- making special provisions for transit in return for special upgrade rewards;
- encouraging ridesharing by accepting reduced maximum requirements for parking (Lockwood, 1986).

Nevertheless, the six requirements listed above only pertain to the PDD's. Although the PDDs encompass a significant portion of the Dallas Parkway Center land area, land that was already zoned prior to the mid-1980s or that had not been requested for rezoning are exempt. They do not have the above six requirements attached to them.

The Dallas Parkway Center Project

In 1986, the City of Dallas assembled a consultant team to develop solutions to the PC's transportation problems and make the area more attractive. The Dallas Parkway Center Project is an outgrowth of the "1985 Dallas Parkway Land-Use and Transportation Study." With the downturn in the Dallas economy, development in the PC virtually ceased, nearly coincident with the formation of the Dallas Parkway Center Project. The project's scope was therefore broadened to include economic development issues as well.

The consultants compiled their analysis of the area into a "vision" for the Parkway Center. In the consultant's report, existing conditions in the Parkway Center are described and a forecast made of future market conditions. Based on the consultant's assessment, a coordinated program of transportation and urban design improvements is outlined for the area, which requires an aggressive program of cooperative efforts involving both the public and private sectors. As stated in the consultant's report, "key to the ensuing dialogue between city staff, property owners and other interested persons will be identifying and prioritizing those improvements that will have the greatest impact on the success of the area." While the consultant's analysis and recommendations are applicable to the entire PC, the Development Program described focuses primarily on the City of Dallas' portion of the PC.

The Parkway Center Project report describes the following strategy to promote the area:

- Capitalize on the existing locational and visibility assets of the Parkway Center.
- Provide a level of transportation service and urban design amenity which is superior to competing suburban locations.
- Maximize the potential utilization of the large developable or redevelopable land area.
- Establish a transportation and urban design framework of facilities and guidelines for transition of the Parkway Center from a collection of independent projects to a higher density cohesive major suburban center.
- Produce a distinct overall image of a high quality activity center with a range of unique subdistricts (Parkway Center Project Summary Report, 1988).

The unique aspect of the PCP is that it incorporates an urban design model and a transportation framework that fit together. The project consultants envision that the urban design component will help the PC function more efficiently as well as look more attractive.

They anticipate that the result will be a near doubling of activity levels in the next 20 to 25 years. The recommendations the consultants have made regarding the transportation are designed to accommodate aggressive development objectives.

The type of transportation services that the Parkway Center Project consultants recommend include improving transportation to the PC as well as within the Center. To increase the traffic load that the surrounding roads can handle, the consultants recommend widening arterials as well as adding expressway exits to improve roadway access to the PC. For travel within the Parkway Center, they propose constructing new roadways to form a grid pattern, developing an internal transit system, and constructing pedestrian walkways which would link offices to consumer services.

To reduce the transportation demand the consultants want to see transportation demand management aggressively encouraged by both the private and public sectors. They support improving regional bus service to the PC. In addition, the consultants recommend that

the public sector introduce fixed guideway transit, either through light rail or HOV lanes. The consultants recommend that the private sector reduce demand by 10 percent by encouraging ridesharing and van pools. They further recommend that the private sector spread the peak hour itself.

Private sector property owners and employers, organized with the support of Dallas, Farmers Branch, and Addison, created a transportation management association (TMA) to reduce total transportation demand, particularly during peak periods. As of 1988, the TMA working in cooperation with DART has developed a shuttle bus concept and has sponsored an employer/employee travel survey. During the development "standstill" when traffic congestion is a less pressing concern the TMA has been inactive. However, the project consultants suggest that the TMA coordinate demand management activities among local employers and represent the PC's interests to local governments in preparation for the anticipated development in the 1990s.

Achieving the urban design framework proposed by the project consultants involves completing three components. First, the consultants suggest creating a Parkway Center Boulevard Loop within the PC by improving four existing streets. This loop would establish an identifiable urban district and add valuable property frontage besides that which faces the Tollway and the LBJ Freeway. Second, the urban design plan involves creating an "urban grid of primary streets and image corridors." Third, the project consultants recommend enhancing or creating three distinct subdistricts within the PC.

Ultimately, the project consultants envision the Parkway Center as a planned community. The urban design proposal would maximize the area's development potential and create an attractive environment for promoting new development. In terms of addressing issues and groups that affect the Parkway Center from outside, the project consultants propose establishing a strong association similar to the one existing in the CBD. They envision such a group absorbing the functions of the TMA as well as discussing issues with city officials and lobbying the PC's interests.

Funding the Dallas portion of the Parkway Center's "economic development" scenario rather than the "business-as-usual" scenario will require additional acres of right-of-way and cost an additional \$91.5 million over and above what would normally be invested in the area. The PCP anticipates the following cost allocation for financing the "economic development" increment: DART and SDHPT will pay \$21 million, the private developers will pay \$19.6 million and the City of Dallas will pay \$11.1 million which leaves a residual of \$39.5 million.

It is suggested that a feasible approach for funding the remaining \$39.5 million would be to establish a Public Improvement District (PID) or other public-private funding mechanism. The Park Center Development Program (1988) points out that establishing a "PID, a quasipublic entity, would allow for the provision of extraordinary improvements within a clearly defined geographic area." There is no set formula for determining the amount that each group will pay. However, the general principal is that there should be "some correlation between the accrual of benefits and costs." Using this criterion the PCP report recommends that the City of Dallas assume 33 percent of the transportation-related improvements and 20 percent of the urban design component. This would amount to a

contribution by the City of Dallas of \$10.1 million and private sector funding of \$29.4 million.

CONCLUSION AND DISCUSSION

The Parkway Center Development Program is an all-inclusive plan addressing transportation land-use and urban design issues affecting the Dallas Parkway Center. The central proposal of the program is to create an attractive and identifiable urban area which recognizes and strengthens three subdistricts within the City of Dallas portion. In addition, it addresses regional transportation issues that affect access to the PC and internal transportation issues to limit demand. The transportation plan covers all modes of travel and has a short and a long term component. Implementation of the program's recommendations involve efforts from both the public and private sectors.

The scope of the PCP has changed as extenuating circumstances required it. The PCP began as a transportation management and urban design program. When the study began, the City was coping with managing growth. The bust occurred while the study was being completed. The Parkway Center Project responded to the business slowdown by including an economic development component.

The City of Dallas has provided unusually strong leadership in promoting planned development in the PC by funding the Parkway Center Project. City staff is currently discussing with developers and property owners the Project's conclusions, and working toward a consensus plan. The City of Dallas can potentially become a development partner with the PC property owners through an aggressive program of public expenditures in the area to preserve the transportation system and provide a higher level of public amenities. Furthermore, the City of Dallas has initiated meetings between the neighboring cities of Farmer's Branch and Addison to discuss ways to implement the consultant's recommendations on a PC-wide basis.

For the City of Dallas, growth management is an important issue. The city has adopted a land development regulation process that is based on requiring developer contributions in the form of negotiated cost-sharing agreements. The City Development Code also provides the flexibility to promote public/private participation in funding transportation improvements and protecting contiguous land uses through negotiation of rezoning requests.

For the most part, the Parkway Center Development Program is still in the proposal stage. Achieving the program's development goals will depend on three factors: the speed and the extent to which the economy recovers, the impact of transportation and urban design improvements on the area's economic development and the extent to which the multiple property owners can work with each other and with the public sector.

The PC report argues that the benefits from providing the "extraordinary" level of transportation improvements and design amenities far outweigh the costs. If the city and the private developers follow the program's urban design and transportation plan, the PC would be moving in the direction of a planned community. Whether there will be sufficient development in the 1990s and the 2000s to justify large expenditures on transporta-

tion systems remains to be seen.

The last factor, mentioned above, for realizing the PCP's goals is the degree to which the multiple private developers in the Parkway Center can work with each other and with the public sector. Developers will have to agree on the direction they want the Parkway Center to take and make the financial commitment necessary for that to happen. They will also have to work with various public sector entities that provide services outside the private sector's control.

Evidence so far suggests that the city and the private developers will be able to successfully work together. First, the City of Dallas is eager for development in the PC to expand, therefore it is reasonable to expect the City to be willing to work with the private sector in an effort to improve the overall infrastructure and image of the area. Second, based on the consultant's recommendations and the City of Dallas' encouragement, the property owner's formed the Parkway Center Property Owner's Association in June 1988. The group has already begun working with city staff to develop a consensus on the report's proposals. This new association has incorporated and has plans to expand its agenda to absorb the functions of the TMA and eventually lobby for the PC's interests to various public agencies.

Transferability of the Parkway Center Project

The PCP is based on two underlying assumptions that other communities may want to consider. First, coordinating land use and transportation planning with urban design and landscape improvements can be used as an economic development tool. Second, solving problems associated with suburban employment can most effectively be solved by soliciting the cooperation and participation of multiple public and private groups.

As mentioned in the first assumption, the PCP report anticipates that investment in infrastructure, mass transit, and urban design will increase the tax base and bring in more revenue than if the City of Dallas follows a more conservative investment strategy. It predicts that following the "economic development" investment strategy will have a payoff ratio of 1.72. In contrast, if the City of Dallas follows a "business-as-usual" scenario the payoff ratio will be 1.13. However, it remains to be seen if the PCP consultants' predictions are accurate.

Regarding the second assumption, both the complexity of the problems associated with the increase in suburban employment as well as the cost and benefit stream for providing infrastructure and urban design improvements make it seem safe to assume that localities will increasingly depend on joint efforts between public and private sector groups for solutions. The Parkway Center Project represents one example of such a cooperative effort.

The City of Dallas is the agency that has promoted such cooperation throughout the project. The City's efforts in promoting cooperative efforts began with its funding of the PCP. Furthermore, the City of Dallas has continued to promote consensus building and joint participation as the project has progressed. Its role in setting up meetings with the PC property owners to present the consultant's findings and encouraging them to establish a business association are examples of the City's continuing role in promoting consensus

building. As a result of the City of Dallas' efforts, business leaders desiring to have a say in the development plans are joining together to form a stronger business association than has existed in the past.

Transportation and urban planners around the country will be carefully watching the innovative proposals coming from the Dallas area to assess their impacts on urban mobility and economic development. Furthermore, as the PCP proposals are discussed, revised, and implemented the merits of such a cooperative effort involving the public and private sectors can also be evaluated.

CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

The primary purpose of this study was to develop an understanding of the suburban activity center mobility problems and the ways that local public and private agencies address these problems. In order to achieve this, 64 suburban activity centers were analyzed in 23 metropolitan areas and their characteristics were compared with those of the CBDs. In addition, in-depth case studies were conducted on four suburban centers.

This chapter presents a summary of the major findings from the national survey and the case studies. Conclusions, policy, and research recommendations are discussed here to assist those responsible for managing suburban mobility issues.

MAJOR FINDINGS

Findings from the case studies supplemented and supported for the most part results from the survey research. Results from this study reinforced conclusions from previous research.

Types of centers

An analysis of the survey research results has concluded that there are four distinct categories of centers, a reduction from Cervero's six suburban center categories. These four include:

1. Office concentrations and office parks
2. Large and moderate mixed use developments
3. Megacenters
4. Large Corridors

Office concentrations and parks vary significantly from mixed use developments primarily in mix of land uses. Megacenters tend to be more similar to CBDs in density, mix of land uses and size and are very different from the previous two categories. Large corridors may not be activity centers in the strict meaning of the word. These corridors differ significantly from all other types of centers in acreage and density. They have the most ill-defined boundaries. However, they are too important to ignore because they represent the typical suburban environment and there may be more of these centers in the future if present trends continue.

Land Use Design and Transportation Characteristics

Suburban activity centers tend to have densities too low to support transit and pedestrian travel patterns commonly found in CBDs. Variations in travel behavior can be easily



explained by the differences in land use mix, density and design as well as type of transportation facilities available at the centers. Most suburban commuters have access to autos and suburban centers have ample free parking that further encourages auto commuting. This was another important finding in the Cervero study. The survey results indicate that internal circulation through shuttle service, and better rail and bus service is commonly found in higher density settings such as CBDs and megacenters. In at least two of the case studies, the Hacienda Business Park and the Dallas Parkway Center, we were able to witness the importance and implications of these factors. HBP is the typical low density pleasant looking office park lacking characteristics that are conducive to transit and pedestrian modes. The recently completed plan for DPC is recognizing the importance of urban design in improving traffic conditions and is recommending corrective actions to that effect.

Findings from the survey research indicate that work trips to CBDs involve longer commutes than those to other SACs, even though distances are similar. This confirmed results from a previous study in Houston (Rice Center January 1987). Travel needs are dispersed, making traditional transit service too expensive to operate.

Most frequent problems mentioned in the survey are those involving intra-center congestion due to traffic passing through. The earlier-mentioned Rice Center study (January 1987) of Houston activity centers found similar results. It also found that the Houston CBD has a substantial larger supply of transportation facilities than the suburban activity centers. It is widely accepted that congestion is more of a perception problem which has meaning only in relative terms. According to both the case study findings as well as the survey results for most of the centers studied, traffic congestion is not perceived as a major problem yet. It is the fear of anticipated future congestion that most often stimulates local action. This finding was found to be especially true in the national survey and the case studies of the BWI and the Hacienda Business Park centers. In general, public sector concerns tend to be greater than those of the private sector. Only in megacenters private concerns are higher than those of the public sector.

Lack of available affordable housing in the areas close to SAC's was found to contribute to mobility problems. This was especially true in the two California cases. The rapid growth and high land values in that state are probably responsible for this phenomenon. Cervero's (1988) findings are consistent with this conclusion.

Public/Private Partnerships

This study's primary contribution is that it focused on the role of public/private partnerships in forming organizational structures and implementing financing mechanisms for the purpose of solving suburban mobility problems. Both the case studies and the survey results indicate that private or public solutions cannot develop in isolation. They can only be successful if there is cooperation and support between the two sectors.

In a number of instances, the private sector has taken considerable leadership in seeking solutions to an area's mobility problems. For example, it has demonstrated the ability to be effective in project implementation, and in lobbying for local and regional issues, i.e. Houston regional mobility plan. Moreover, through peer pressure, employer associations

can have significant effects in influencing individual behavior.

Organizational Structures. Among the areas that have congestion problems, 70 percent of the megacenters and 40 percent of CBDs have a TMA. A larger number of both types of centers (83 percent) have an employers association.

The case studies demonstrate that there is no single organizational formula that is best for all centers. Picking the most desirable form for a particular center depends on local conditions, pressures and opportunities. For example, in Warner Center the employers' association, after long discussions, decided to form a TMA. In BWI and HBP, TMAs serve very concrete functions such as central information clearinghouse for commuters, and administration of a TDM ordinance respectively. On the other hand, the Dallas Parkway Center plan proposes to absorb the TMA in a newly formed property owners association. In Greenway Plaza, in Houston, where the major developer also manages transportation matters and provides transportation improvements and services in the area, there is no TMA or employers association.

The BWI developed its highly successful TMA in a three-stage process which other centers may want to consider.

- 1) It started with people who had a vested interest in improving mobility and access in the area.
- 2) These people have assumed leadership positions and contributed time and money to get the organization going. Moreover, they have hired staff and conducted studies.
- 3) The BWI TMA has brought in public agencies to support and expand the organization to include all interested parties.

One advantage that BWI had and appears to be important in early stages was the presence of federal funding and technical assistance by the local MPO.

Financial mechanisms. Results from the survey research and all the case studies have shown a high degree of participation by developers and major employers in contributing funds for planning studies, highway improvements and shuttle services. Results also indicate frequent use of impact fees and special assessment districts as the mechanisms used to achieve private sector contribution. Private sector participation depends on the vitality of the local economy. It is unrealistic to expect major financial concessions or developer exactions in a declining economy without other strong incentives offered from the public sector. Strong business leadership was observed in both California cases. Government leadership was more obvious in Baltimore and Dallas cases. In the former case, the state played an important role, while in the latter case, the leadership came from the city.

Contracting out services with other public or private operators was also found to be practiced in all the case studies. The separation of policy from operations in Los Angeles and the availability of multiple public and private operators in the Bay area has been claimed to have improved transit efficiency. In the San Francisco region the Metropolitan Transportation Commission, and in the Los Angeles area the County, play important roles

through their authority to allocate funds. The Pleasanton trip reduction ordinance is an example of a successful city/developer cooperation. Finally, the establishment of the Parkway Center TMO required close collaboration between employers and property owners and public officials in three neighboring jurisdictions.

Transportation Programs. Several transit agencies and suburban municipalities are beginning to institute innovative programs. For example, Baltimore, and Los Angeles are expanding express commuter bus service from suburb to suburb and reverse commuter service from central city to suburbs. In Dallas area cities, developers are encouraged to restrict parking around new developments and to subsidize public transit. Major employers in suburban centers are provided with new transit services based on demand-responsive vehicles (jitneys) to augment and supplement existing bus routes. On the other hand, San Francisco, Los Angeles, and Baltimore are expanding or establishing new rail services to address suburban centers mobility needs.

The public sector is more interested in trying alternatives to major roadways and parking investments than the private sector. In megacenters, both private and public sectors are interested in alternative solutions. The quantitative analysis found that a strong relationship exists between the presence of a TMA and transportation programs such as employer transit subsidies, trip reduction ordinances, and area circulation improvements. Roadway improvements are strongly related to employers associations. In CBDs transit improvements, auto use reductions, i.e. parking restrictions and increased parking fees are more common.

Role of State and Local Policies

One important finding, especially from the case studies, is that state and local policies play important roles in shaping mobility problems and on the approaches used by the SACs to solve them. The four center studies in three states point to the differences that can be attributed to state influence. Such differences include: (1) State economic conditions, i.e. Centers in California and Maryland are enjoying high rates of growth due to the economic prosperity in those states, while in Texas the recession has affected development; (2) the role of top executives and state legislatures in taking key actions, i.e. Maryland and California give transit a higher priority than does Texas; and (3) State funding levels, i.e. The highway program in California has been underfunded, while there have been significant recent funding increases in Texas and Maryland.

At the same time, there are interesting differences in attitude and style observed in cities within the same state regarding their approach to transportation and development issues. For example, there are clear distinctions in attitudes towards transit between the Los Angeles and San Francisco metro areas. The roles and effectiveness of regional agencies also differ substantially from case to case.

POLICY AND RESEARCH RECOMMENDATIONS

The suburban mobility problem is a complex one. It involves transportation, urban development, economic development, political, and environmental issues. For solutions to be effective, they require coordinated action by public and private concerns at all levels of government and across functional lines. Solutions should combine both increased supply of arterials and freeways as well as demand management actions. Other researchers like Deakin 1988, Lockwood 1988, and Cervero 1988 have reached similar conclusions.

Suburban activity centers, for the most part, are located beyond boundaries of the central city, however, their traffic problems and management are directly dependent on conditions in the entire region. Often they are in unincorporated areas or they span multiple jurisdictions making it more complicated to address suburban mobility issues. Local governments facing problems of rapid growth and lagging infrastructure are confronted with the dilemma of having to choose between charging developers fees for expanding infrastructure and controlling growth with the undesirable consequence of losing tax revenues. Decentralization of transit services is considered to be a positive move in improving the efficiency of regional services. Nevertheless, there is a need for a centralized policy setting mechanism that assures coordination of actions towards a common regional plan. Finally, there are still legislative and institutional barriers at the federal, state and local levels which inhibit implementation of innovative approaches such as competitive contracting for transit services.

Following are some ideas designed to assist Federal, state and local officials as well as the private sector in making transportation decisions in suburban centers.

Federal Role

Federal policies should aim to coordinate policies across functional departments (i.e. UMTA, FHWA, HUD, EDA, and EPA) and reduce barriers to implementation of innovative actions at the local level. These include relaxing regulations to encourage competition between transit providers (shared rides in taxis, tax incentives for vanpools, insurance protection for private providers) as well flexibility in meeting requirements for federal grants.

Federal initiatives should promote the consideration of a full range of local options available in financing, operation and maintenance of transportation facilities and services. This may be accomplished through the provision of technical and, if necessary, financial assistance. Specific policy should be mandated only where satisfactory local options are not being considered.

State

States play an important role in planning, constructing and maintaining the highway system by providing funding and legal authority. Moreover, since they are removed from the local scene, they can be sensitive to overall regional issues. Therefore, they appear to be the appropriate entities to provide needed leadership and stimulate change. Nevertheless, in doing so they should avoid specifying how to implement local actions.

The list that follows offers specific recommendations for state policy:

- Provide leadership by supporting controversial issues such as HOV lanes where parochial interests overshadow potentially greater regional benefits,
- Encourage business participation by providing incentives such as tax credits for expenditures by employers and developers,
- Provide enabling legislation for innovative organizational and financial techniques,
- Strengthen regional institutions as the intermediate agencies that will implement and monitor state policies,
- Broaden the mission of state transportation departments to give transit equal priority to that enjoyed so far by highways, and coordinate with other urban development policies,
- Provide guidelines for regional planning (States such as Florida, and New Jersey, Maine, Vermont, and Oregon have already taken strong growth management initiatives).

Regional

Current regional agencies (i.e. MPOs), with a few exceptions, lack political support and authority to deal with suburban mobility problems. However, it can be argued that they are the logical agencies to coordinate public and private initiatives as part of the development of the regional transportation plan and transportation improvement program. Consideration should be given to coordinate transportation efforts with regional land use policies. For regional public bodies to assume greater role it is required that state and local governments redefine institutional responsibilities and relinquish certain powers.

There are two examples of innovative regional policy implementation. The first is property tax-base sharing which has been adopted in Minneapolis-St Paul and New Jersey Hackensack Meadowlands. The second is the fair-share housing requirements based on the New Jersey Supreme Court's Mount Laurel ruling. These policies deserve serious consideration in other areas.

Local

Local governments have the power and means to implement actions which address the problems of suburban congestion for centers located within their city limits, and or collaborate with neighboring jurisdiction for centers located beyond city boundaries. It is recommended that local governments consider the following:

- Give serious consideration to alternative solutions that go beyond the continuous expansion of roadway capacity, such as transportation demand management approaches.

- Reconsider urban design requirements and encourage land use and development decisions which include transit involvement, i.e. reducing parking requirements and requiring major employers to subsidize public transit.
- Facilitate formation of new organizational structures in activity centers, i.e. TMAs.
- Encourage private sector leaders to participate in the planning, financing, and implementation of transportation improvements.

Private Sector

The research findings have identified several promising opportunities for private sector involvement in addressing suburban mobility needs.

- Area property owners, and major employers should consider establishing appropriate organizational structures, such as TMAs which can lobby for transportation improvements, promote transportation management solutions, like ridesharing or employer transit subsidies.
- Developers can expedite the completion of projects by contributing to construction and financing of facilities.
- Private operators can participate by providing contracted out transit services, while transportation brokers, like CommuterComputer in Los Angeles, can take advantage of increasing opportunities for coordination of regional travel services.

FUTURE RESEARCH

Suburban mobility is a relatively recent problem and suburban mobility research has recently gained popularity. However, this study found that there are major deficiencies in data and theoretical models. The research so far has concentrated in analyzing the problem. This study is one of the few that look at solutions. Its findings show that many SAC's transportation improvement strategies are still in the planning stage or have only recently been implemented making it too early to evaluate them. It takes time before such programs can produce measurable results. Finally, it is important to acknowledge the limitations in generalizing results from case studies.

Rice Center experienced difficulty in getting good, consistent survey responses. There were ambiguities in defining areas and in obtaining reliable data. There is no public system currently in place which keeps a comprehensive inventory of office, retail and employment data, especially for suburban employment centers. City and MPO officials are not well equipped with information on suburban centers which often cross census tracts and municipal boundaries. Real estate developers and area organizations were found to be much more responsive and knowledgeable of suburban conditions but do not have the resources and mission to engage in systematic data collection efforts.

Following are some suggestions for future applied policy research that UMTA could undertake:

- There is a need for a complete and periodically updated inventory of activity centers. Prepare and maintain a national transportation management organization directory.
- There is a need for better definition of congestion to distinguish between real vs perceived problems. The definition should include influencing factors which include: rate of change, anticipated, degree of control.
- There is a need to improve enforcement and monitoring of TDM ordinances, i.e. Los Angeles and Pleasanton, as well as the effectiveness of new technologies in meeting suburban center mobility needs, i.e. the Las Colinas people mover, etc.
- Continue to collect and disseminate information on best practices around the country through workshops and seminars, and prepare a Guidebook on innovative transportation and financing solutions in suburban centers.
- Provide action-oriented research/technical assistance to suburban areas to start TMAs, develop model parking ordinances, start employer subsidy programs, develop traffic mitigation ordinances, develop transit service programs for reverse commuting. If suburban center mobility problems can be identified in early stages of development, corrective actions may be possible.

REFERENCES

CHAPTER 1.

Orski, Kenneth C. "Toward a Policy for Suburban Mobility" in *Urban Traffic Congestion*, ITE, Washington, D.C. 1986.

Cervero, Robert. *America's Suburban Centers: A Study of the Land Use—Transportation Link*. Report for UMTA. April, 1988.

CHAPTER 2.

Atlanta University Graduate School of Business. *Transit-Linked Development: A Case Study of Atlanta's MARTA System*. Report for UMTA. January, 1985.

American Public Transit Association. "Companies Build County Connection Shelter." *Passenger Transport*. APTA. March 11, 1985.

———. "Free Rides, Cokes, Music Light Up MARTA's Fourth." *Passenger Transport*. APTA. June 16, 1986.

———. "Metro—Dade: Catalyst for Miami's Future." *Passenger Transport*. APTA. June 2, 1986.

———. "NJ Transit/Seltzer Partnership Delivers Needed Rail Station." *Passenger Transport*. APTA. June 16, 1986.

Brosch, Gary L. "Possible Private/Public Financing Methods." *National Conference on Suburban Expressways and Beltways: Proceedings*. The Commonwealth of Massachusetts, Executive Office of Transportation and Construction. June, 1986.

Cervero, Robert. *America's Suburban Centers: A Study of the Land Use—Transportation Link*. Report for UMTA. April, 1988.

———. *Ripple Effects of Transit Service Contracting*. Report for UMTA. March, 1986.

———. *Suburban Gridlock*. Center for Urban Policy Research. New Brunswick, NJ. 1986.

———. "Unlocking Suburban Gridlock." *Journal of the American Planning Association*. Vol. 52, No. 4. Autumn, 1986.

Curry, David and Karen Fraser-Middleton. "Pleasanton TSM Ordinance: a new approach to traffic mitigation." *Transportation Research Record* 1018. 1985.

DeGrove, John "Growth Management and Government," paper presented at the Research Gaps in Growth Management Conference, Alexandria, VA, September 1988.

Dunphy, Robert "Suburban Mobility, Reducing Reliance on the Auto in DuPage County,

- Illinois," *Urban Land*, December 1987, pp. 6-9.
- Dowall, David E. "Planners and Office Overbuilding." *Journal of the American Planning Association*. Vol. 52, No. 2. Spring, 1986.
- Hatry, Harry P. *A Review of Private Approaches for Delivery of Public Services*. The Urban Institute Press. Washington, D.C. 1983.
- Lockwood, Stephen. Memorandum concerning a telephone survey of transportation management associations; this survey was funded by the City of Dallas. January, 1988.
- _____. "Kaleidoscope or Map: Suburban Congestion and Institutional Barriers" presentation at the Transportation Research Board meeting, Washington, D.C., January 1988.
- Metropolitan Transit Authority of Harris County. *Building a Regional System: Report to the Board on Results of Alternatives Analysis*. 1987.
- Oregon Business Magazine. *I-5 Corridor Association: "Three Years and Growing."* Oregon Business Magazine. 1988.
- Orski, C. Kenneth. *Toward a Policy for Suburban Mobility*. The Institute of Transportation Engineers. 1986.
- Ossenbruggen, Paul J. and Michael J. Fishman. "Impact of Transit Line Extension on Residential Land Use." *Transportation Research Record* 627. 1977. pp. 10-13.
- Pratt, Richard, H. "Planning Solutions - Does the Emperor have any Clothes?" Paper presented at the Annual Meeting of the Transportation Research Board, Washington, D.C., January 1988.
- Prevedouros, Panos D. and Joseph L. Schofer. "Changing Transportation Behavior as a Factor in Suburban Congestion". paper for presentation at the Transportation Research Board meeting, Washington, D.C., January 1989.
- _____. "Transit Center: New York City, N.Y." *Private Sector Briefs*, No. 5-8. May 1988.
- Rice Center. *Assessment of Changes in Property Values in Transit Areas*. Report for UMTA. February 1987.
- _____. *Houston's Major Activity Centers and Worker Travel Behavior*. Prepared for the Houston-Galveston Area Council. January 1987.
- _____. "'Identical' Operators: Bakersfield, California." *Private Sector Briefs*. No. 6-7. August 1987.
- _____. "Low-Demand Routes: Montgomery County, Maryland." *Private Sector Briefs*. No. 9-2. February, 1987.

- _____. "Private Leadership in Transit Provision: Denver, Colorado." *Private Sector Briefs*. No. 4-7. December, 1987.
- _____. "Privately Financed People Mover: Las Colinas, Irving, Texas." *Private Sector Briefs*. No. 4-5. April, 1987.
- _____. Identification of Area-Based Opportunities for Joint Action, Draft Report prepared for the Houston MTA, February 1987.
- _____. "Privately Financed People Mover: Las Vegas, Nevada." *Private Sector Briefs*. No. 4-6. April, 1987.
- _____. *Special Assessment Financing for Transit Improvements*. Report for UMTA. July, 1987.
- _____. "Vanpooling: Brevard County, Florida." *Private Sector Briefs*. No. 11-3. December, 1987.
- _____. "Regular Route Transit Services: London, England." *Private Sector Briefs*. No. 7-2. May, 1986.
- _____. "CTA Special Services—Elderly and Handicapped Paratransit Services: Chicago, Illinois." *Private Sector Briefs*. No. 8-1. November 1985.
- _____. "Mobility and Congestion: Office Location Issues in Houston", *Research Brief 1*, April 1979.
- _____. *Joint Development Report*. Sponsored by UMTA. June 1979.
- Romanos, Michael. "Five Stages of Metrotown Evolution." Speech delivered at the APA Conference in San Antonio. 1988.
- Soot, Siim and Margaret A. Johnson. *Suburban Megacenters: Potentials for Public Transportation*. Undated.
- Transportation Research Board. *Strategies to Implement Benefit-Sharing for Fixed Transit Facilities*. June, 1985.
- _____. "Workshop on Transportation Requirements for Urban Activity Centers", *Transportation Research Circular*, No 304, June 1986.
- _____. *New Organizational Responses to the Changing Transit Environment*, Special Report 217, 1988.
- United States Department of Transportation. *Administrative Impacts of Private Financing Techniques for Urban Transportation*. Research and Special Programs Administration. January, 1984.
- _____. *Alternative Financing for Urban Transportation: The State of the Practice*.

Washington, D.C. July, 1986.

_____. *Private Sector Involvement in Urban Transportation*, Washington, D.C., December 1986.

Urban Mass Transportation Administration. *A Guide to Innovative Financing Mechanisms for Mass Transportation: An Update*. Washington, D.C. December, 1985.

_____. *Transit and the Polycentric City*. Washington, D.C. September, 1981.

_____. *The Transportation Management Organization: Can it help your downtown congestion problem?* Technical Assistance Program. Washington, D.C.

The Urban Land Institute. *Downtown Office Growth and the Role of Public Transit*. 1982.

_____. *Paying for Growth: Using Development Fees to Finance Infrastructure*. 1986.

Young, David. "Chicago—Trying to Get Around the Transit Dilemma from Urban Sprawl." *Mass Transit*. Vol. 11. November, 1984.

Deakin, Elizabeth. "Suburban Traffic Congestion, Land Use and Transportation Issues, presentation at the Transportation Research Board meeting, Washington, D.C., January 1988.

Dunphy, Robert. "Urban Traffic Congestion: A National Crisis?", *Urban Land*, July 1984.

JHK & Associates. "Travel Characteristics at Large-Scale Suburban Activity Centers", presentation at the Transportation Research Board meeting, Atlanta, October 1988.

Pratt, Richard. "Planning Solutions - Does the Emperor Have Any Clothes", presentation at the Transportation Research Board meeting, Washington, D.C., January 1988.

Uptown Houston Assoc., *Harris County Improvement District #1*, May 1988.

CHAPTER 4.

Los Angeles

Community Redevelopment Agency, *Break the Evening Gridlock*, April 1987.

Community Redevelopment Agency, *Strategic Actions for Improving Transportation in Downtown Los Angeles*, April 1987.

Commuter Transportation Services, Inc., *Travel Mode Statistics for Warner Center*, April 1985.

Commuter Transportation Services, Inc., *Warner Center Reference Report*, July 1984.

Commuter Transportation Services, Inc., *Warner Center Transportation Survey Results*,

September 1987.

Department of City Planning, *Canoga Park-Winnetka-Woodland Hills District Plan*, Los Angeles, California, October 1984

Rice Center, "Benefit Assessment Districts", *Private Sector Briefs*, November 1986.

Rice Center, "Coastal Transportation Corridor", *Highway Financing Briefs*, August 1987.

Rice Center, "Contracted Commuter Service in the Los Angeles Area", *Private Sector Briefs*, August 1987.

Rice Center, "Foothill Transit Zone", *Joint Center Exchange*, August 1988

Rice Center, "Irvine Spectrum Transportation Management Association", *Private Sector Briefs*, February 1987.

Rice Center, *Private Sector Involvement in Urban Transportation*, U.S. Department of Transportation, Washington, D.C., December 1986.

Rice Center, *Suburban Activity Center and Worker Travel Characteristics, Research Summary*, 1988.

Southern California Association of Governments, *Regional Mobility Plan*, February 1988.

Southern California Association of Governments, *San Fernando Valley Area Study: Short Range Transportation Improvements*, May 1986.

Pleasanton

Association of Bay Area Governments. *David v. Goliath: How Local Decision-makers are Confronting Bay Area Planning Challenges*. January, 1988.

Association of Bay Area Governments, Bay Area Air Quality Management District, and Metropolitan Transportation Commission. *Air Quality Planning in the Bay Area: 1988 Status Report*. March, 1988.

Callahan, Joseph W. Unpublished speech delivered at the Federal Highway Administration conference in Houston. August 31, 1987.

Cervero, Robert. *Commute Choices in Suburban Labor Markets: A Case Analysis of Pleasanton, California*. June, 1987.

Cervero, Robert. *Jobs-Housing Imbalances as a Transportation Problem in Suburban Employment Markets: An Empirical Investigation*. Working paper produced for Rice Center. May, 1987.

Contra Costa County Community Development Department. *Recent Growth in Contra Costa County, the San Francisco Bay Area, and California*. April, 1988.

- John Blayney Associates and David M. Dornbusch & Co. *BART Impact Program: Study of BART's Effects on Property Prices and Rents*. Working paper prepared for DOT and HUD. November, 1978.
- *Land Use and Urban Development Impacts of BART*. Prepared for DOT. April, 1979.
- Metropolitan Transportation Commission. *Regional Transportation Plan for the Nine-County San Francisco Bay Area: 1987 Edition*. December, 1987.
- Metropolitan Transportation Commission. *Beyond Transportation: 1987 Annual Report*.
- Pleasanton, City of. *The Pleasanton Plan: A guide to Community Resources, Future Trends, and Long Range Plans*. September, 1986.
- Pleasanton, City Council of the City of. *Amendment to Title II of the Ordinance Code of the City of Pleasanton Adding Chapter 17 (Transportation Systems Management)*. Ordinance No. 1154, October 2, 1984.
- P.O.D. Inc., Landscape Architects; Fee and Munson, Architects; and Bissell and Karn, Inc., Civil Engineers. *Hacienda Business Park, Pleasanton, California: Design Guidelines, Development Plan*. September, 1987.
- Rice Center. *Assessment of Changes in Property Values in Transit Areas*. Prepared for UMTA by the Joint Center for Urban Mobility Research at Rice Center. February, 1987.
- Sturgis, Ness, Brunsell & Sperry. *City of Pleasanton Improvement Bonds, Assessment District No. 1986-7, Series A, North Pleasanton Improvement District No. 2 (Alameda County, California): Offering Memorandum*. Official statement authorized by the City of Pleasanton concerning bond issue for NPID #2. November 18, 1986.
- Sturgis, Ness, Brunsell & Sperry. *City of Pleasanton Limited Obligation Improvement Bonds, Assessment District No. 1986-9, Series A, North Pleasanton Improvement District No. 3 (Alameda County, California): Official Statement*. Official statement authorized by the City of Pleasanton concerning bond issue for NPID #3. August 11, 1987.
- TJKM Transportation Consultants. *Tri-Valley Transportation Study; and Analysis of the Pleasanton Area Traffic Circulation System*. July, 1983.
- United States Department of Transportation. *Administrative Impacts of Private Financing Techniques for Urban Transportation*. Prepared by Dr. Duane Windsor, Rice University, and Rice Center. January, 1984.
- United States Department of Transportation. *Alternative Financing for Urban Transportation: The State of the Practice*. Prepared by Rice Center. July, 1986.
- United States Department of Transportation. *A Guide to Innovative Financing Mechanisms for Mass Transportation: An Update*. Prepared by Rice Center. December, 1985.

Baltimore

"Development Impact Fees" Ordinance Bill No. 50-87, County Council of Anne Arundel County, Md, July 1987.

MDOT, State Report on Transportation, Vol I Maryland Transportation Plan, 1988,

"Subdivisions-Adequacy of Roads" Ordinance, Bill No. 72-86, County Council of Anne Arundel County, Md, August 1986.

Rice Center. "The Airport Area Transportation Collaborative- Baltimore, Maryland/Washington, D.C. *Private Sector Brief*, No. 5-3, 6/1/1986.

A.J. Zissler, "Working with the Business Community to Solve Transportation Problems" paper presented at UMTA's 4th Annual Symposium on the Private Sector and Public Transit, New Orleans, LA, March 1988.

Regional Planning Council. *A Proposal for the Airport Area Transportation Collaborative*, May 1984.

Lawrence C. Canner, "Assisting Baltimore's Employers in Cutting Employee Commuting Costs".

Dallas

Dallas Times Herald, various issues, 1988.

Rice Center. "Privately Financed People Mover", *Private Sector Briefs*, No. 4-5, April 1987.

Cushman & Wakefield. *1988 Citywide Summary Office Market Dallas*, Mid Year, 1988.

City of Dallas. *Parkway Center Development Program*, August 1988.

-----. Parkway Center Project Summary, April 1988.

-----. North Central Project, undated.

Reid, James. "Negotiating Private Sector Transportation Improvements," *Urban Law & Policy* 8, 1986/1987.

Rice Center. *Private Sector Involvement in Urban Transportation*, U.S. Department of Transportation, Washington, D.C., December 1986.

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Appendix A

INFORMATION ON LAND USE AND TRAVEL CHARACTERISTICS OF MAJOR SUBURBAN EMPLOYMENT CENTERS

Part A

The following information for the employment center identified in the enclosed map was received during the summer of 1987. PLEASE REVIEW, VERIFY THE INFORMATION, MAKE ANY NEEDED CORRECTIONS AND FILL IN THE MISSING INFORMATION FOR WHICH YOU HAVE AVAILABLE DATA, OR REFER US TO THE APPROPRIATE AGENCY OR INDIVIDUAL. FOR FACTUAL INFORMATION PLEASE REFER TO SOURCE AND DATE.

Name of employment center: Employment Center

Contact person:

Agency/organization:

Land use and Employment

1. Current floor space square footage (1987):

Office	_____
Retail and Commercial	_____
Residential	_____
Industrial/Manufacturing	_____
Other	_____
=====	=====
Total	_____

2. Total land acreage: _____

3. What type of firm are the predominant tenants/users in your center, i.e. how do you characterize your center—medical, legal, administrative, etc.:

4. Current number of employees: _____

Design characteristics

5. Coverage (% of land covered by buildings): _____

6. Building types: _____

- (1) low-midrise class A office
- (2) low-midrise older office
- (3) midrise mixed buildings
- (4) mid-highrise towers, decked parking

7. Visitor parking average daily price: _____

- 8. Number of housing units: _____
- 9. Value of average owner occupied housing unit: _____
- 10. Average monthly apartment rent: _____
- 11. Number of major property owners: _____

Travel characteristics

- 12. Average commuting time (in minutes): _____
 - 13. Average commuting distance (miles): _____
 - 14. Modal split (by percentage):
 - driving _____
 - carpool _____
 - vanpool _____
 - transit _____
 - walking _____
 - other _____
 - 15. Proportion of regional commuters driving alone: _____
 - 16. Proportion of workers who participate in:
 - flextime program _____
 - staggered work hours _____
 - 17. Peak level-of-service on principal:
 - freeways _____
 - roadways _____
- (1) A (2) B (3) C (4) D (5) E

Transportation facilities and services

- 18. Passenger rail service in area: _____
 (0) no (1) yes
- 19. Average daily traffic volume on main freeway or artery: _____
- 20. Average parking spaces per 1000 square feet: _____
- 21. Number of peak (hour) bus runs in area: _____
- 22. Number of peak bus runs within 3-miles of area: _____
- 23. Average daily ridership of buses serving area: _____

24. Shuttle service within area: _____
 (0) no (1) yes
25. Type of commuter bus service: _____
 (0) none (1) residential connector
 (2) rail station connector (3) both
26. Bikepaths: _____
 (0) no (1) yes
27. Number of companies sponsoring vans: _____
28. Number of company vans running: _____
29. There is a rideshare coordinator: _____
 (0) no (1) yes
30. There is a rideshare office for a rideshare coordinator: _____
 (0) no (1) yes

Part B

The following information was received during telephone discussions in the past month.

31. Private sector (developer, property owners, major employers, neighborhood associations) concerns about existing congestion: _____
 On a scale from (1) not concerned
 to (5) very concerned
32. Public sector (city, county, RTA) concerns about existing congestion: _____
 On a scale from (1) not concerned
 to (5) very concerned
33. Private sector concerns about anticipated congestion: _____
 On a scale from (1) not concerned
 to (5) very concerned
34. Public sector concerns about anticipated congestion: _____
 On a scale from (1) not concerned
 to (5) very concerned
35. Private sector interest in alternatives to major roadway and parking investments: _____
 On a scale from (1) no interest
 to (5) strong interest
36. Public sector interest in alternatives to major roadway and parking investments: _____
 On a scale from (1) no interest
 to (5) strong interest

37. Private sector desire for an organization to lobby for area needs on a political level: _____
On a scale from (1) no desire
to (5) strong desire
38. Area has a transportation management organization: _____
(0) no (1) yes
39. Area has an area employers association: _____
(0) no (1) yes
40. Area has parking reduction policies (to discourage auto use): _____
(0) no (1) yes
41. Area has a policy to increase parking fees: _____
(0) no (1) yes
42. Area has an employer transit subsidy program (free or reduced cost passes, etc.): _____
(0) no (1) yes
43. Area has a trip reduction ordinance: _____
(0) no (1) yes
44. Area has a privately contracted transportation service: _____
(0) no (1) yes
45. The service in question 44 is competitively procured: _____
(0) no (1) yes
46. Area has traffic circulation improvements, such as diverting truck traffic: _____
(0) no (1) yes
47. Area uses roadway improvements to improve mobility: _____
(0) no (1) yes
48. Does your area have improvements other than direct impacts on transportation conditions, including communications and consciousness-raising or other special programs or policies which encourage transit usage, and especially private actions: _____
(0) no (1) yes
49. Has any data been collected by you or others to use in determining effectiveness of your ongoing or past programs: _____
(0) no (1) yes
50. Area has financing ordinances, such as impact fees: _____
(0) no (1) yes
51. Area has negotiated investment policies or ordinances: _____
(0) no (1) yes

52. Is this activity center perceived to have mobility problems, and if so, what are they?
53. What is your business community doing to address mobility concerns in the short run? In the long run?
54. What is your area government doing to address mobility concerns in the short run? In the long run?

Additional Information

The following are a few additional pieces of information from your area that are still missing.

55. Office space (square footage) in 1970: _____
56. Office Space (square footage) in 1980: _____
57. Office space currently under construction: _____
58. Retail space currently under construction: _____
59. Office vacancy rate: _____ Office absorption rate: _____
60. Retail vacancy rate: _____ Retail absorption rate: _____
61. Average land value per square foot: _____
62. Average office (class A) rent per square foot: _____
- Total number of:
- | | |
|------------------------|---|
| 63. Hotel rooms: _____ | 66. Major sports facilities: _____ |
| 64. Museums: _____ | 67. Regional malls (more _____ |
| 65. Theaters: _____ | than 750,000 square feet retail): _____ |

The following questions are directed to one successful transit related program implemented in this area during the past three years. We are particularly interested in ongoing or completed programs that significantly involved the private sector in the planning, financing, and operational aspects.

68. Program Description
69. Financing Sources
70. Program Evaluation

THANK YOU FOR YOUR COOPERATION. Please send any available documents, reports, survey results, area maps aerial photos, or other relevant information about the activity center.



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