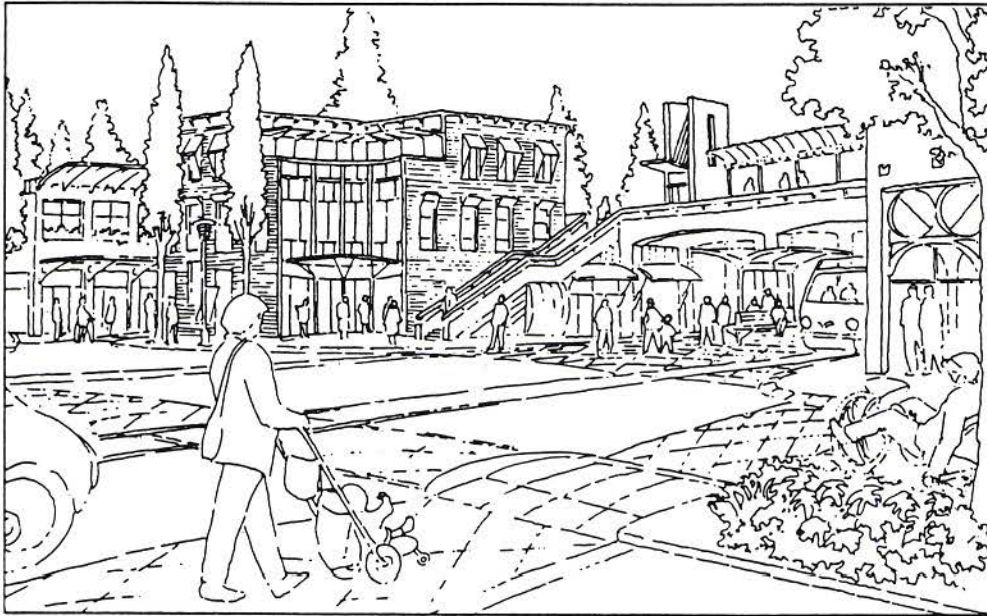


Design for Efficient Suburban Activity Centers



Phase I Report

FHWA Contract: DTFH61-94-C-00146

Calthorpe Associates

with

Fehr & Peers Associates, Inc.

COMSIS Corporation

The Edge City Group

T.Y. Lin International

March 1997



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Executive Summary

Background & Study Purpose

Since the end of the second World War, suburbia has been the primary venue for residential and office growth in the U.S. and has played a critical role in shaping the quality and character of the country's regions. As growth has moved further from traditional city centers, travel and land use patterns have changed substantially. This study focuses on Suburban Activity Centers (SACs) – a component of suburban growth whereby commercial and employment-generating uses are concentrated into developments whose influence rivals that of a region's downtown. The advent of SACs has not only altered the way regions function, but also has long-term implications for funding and planning priorities.

This report has been prepared for the "Design for Efficient Suburban Activity Centers" project sponsored by the Federal Highway Administration. The overall purpose of the study is to identify methods for designing Activity Centers so that they minimize traffic congestion, improve pedestrian, bicycle, and transit mode shares and contribute to healthy regions.

Report Focus & Organization

This report describes the status of research on Suburban Activity Centers and suggests methods for designing new SACs or retrofitting existing SACs. It is designed to be easy to use for a variety of audiences: public agency staff who may be planning for or reviewing plans of

Activity Centers; developers building a portion of an Activity Center; transportation planners working to bring transit to an Activity Center; policy planners helping to refine incentive programs; or local community advocates hoping to improve the livability of their region.

What is a Suburban Activity Center?

The advent of Suburban Activity Centers has had a radical effect on the shape and function of regions throughout the country. These centers are typically made up of large concentrations of office space, retail uses, and more recently, light industrial and manufacturing facilities. Very few Suburban Activity Centers include significant residential components, much less parks, schools, and other civic buildings. While SACs come in many sizes and shapes, there appear to be a number of distinctive common characteristics:

- enough employment-generating uses to rival the region's downtown;
- region-serving commercial uses that draw patrons from the surrounding suburban communities;
- an employment destination, rather than a bedroom community; and
- located adjacent to major transportation facilities, such as freeway interchanges or transit hubs.

While the term "edge city" has often been used to characterize substantial concentrations of new suburban commercial growth, SACs are not always edge cities. Although most recent suburban growth has occurred on undeveloped

property at the edge of regions and at the crossroads of major freeways, close-in suburbs that may have once been a small town or a stop on the subway have also garnered their share of office and retail growth. Thus, for the purposes of this study, Suburban Activity Centers shall comprise both inner suburb and edge city conditions.

Suburban Activity Centers and their Impact on Regions

The impact of Suburban Activity Centers on the function and character of regions has been enormous. The decentralization of jobs has direct implications on the capacity of regional roadway networks, viability and configuration of transit systems, sustainability of downtowns, housing affordability, and an increasing orientation toward the car to the exclusion of pedestrians and other non-auto-modes. As SACs mature, it is becoming clear that local and regional congestion is stifling the accessibility that made these centers attractive to begin with. This has triggered an unending cycle of regional expansion as developers hopscotch to outlying locations where land is cheaper and commuting is easier.

The literature prepared to date regarding Suburban Activity Centers indicates that the current design of SACs does not encourage multi-modal travel by employees and residents. Rather, SACs have been sited and designed on an ad hoc basis, with the interest of low land costs and easy auto accessibility as primary determinates. The research demonstrates a common set of problems:

- high single-occupancy vehicle commuting by SAC workers and residents;
- frequent trips during the day by auto;

- poor pedestrian amenities and transit service;
- lack of housing that is nearby or affordable to SAC workers;
- widely available, low cost parking; and
- expanding, low density regional growth patterns.

At a site-specific level, SACs need strategies that vary depending on the site's location within a region and whether the site is currently developed or is still in the planning stages. On a regional level, SACs must contribute to, rather than detract from, the overall health and sustainability of a region. Transit-Oriented Development patterns, as well as some recommended retrofit strategies, may prove to be useful models in this regard. The focus of this study is to develop and test such strategies within the context of an interdisciplinary approach that integrates land use, urban design, circulation planning, and travel demand management.

What is an Efficient Suburban Activity Center?

Defining an "efficient suburban activity center" is not as simple as it sounds. While quantitative measures of travel behavior, such as mode split and trip generation, provide indicators of performance, they do not fully describe the complexities of "place making." If it can be stated in simple terms, an efficient Activity Center would be one where employees would be comfortable using transit, walking, or bicycling to work because the work environment allowed them to take care of daily needs without a car. This implies that workplaces need to provide a range of services and amenities close by so that daily errands can be performed on foot, a quick lunch is convenient nearby, a child can be visited in an on-site day care center, and the physical environment makes walking enjoyable. Making alternative commuting practices enticing also means ensuring that commuting options are convenient and safe - efficient transit service, timed transfers, carpool rider matching services, and guaranteed rides home - are all important considerations for today's busy working families.

Thus, defining an efficient Activity Center requires monitoring quantitative measures and balancing a variety of qualitative factors. Drive alone mode shares for employees should be at least 10% less than the region as a whole; drive alone mode shares for on-site residents should be much lower. In addition, land use patterns, intensity of development, street systems, urban design, pedestrian and bicycle amenities, transit services, parking, and on-going management should also be considered important, but more qualitative, components of making Activity Centers both efficient and healthy places.

ELEMENTS THAT MAKE ACTIVITY CENTERS EFFICIENT

Mixed-Use

A mix of land uses within walking distance provides employees the option of taking care of daily errands on site.

Density and Activity

Concentrating retail, services, offices, and residences in selected locations helps create activity on the street.

Interconnected Street System

An interconnected street system within the Activity Center keeps local trips on the site and reduces demand on through arterial streets. Shorter trip distances reduce vehicle miles traveled and make walking more convenient.

Pedestrian and Bicycle Orientation

Street and building design should consider how pedestrians and bicyclist experience a place. Too often, a development plan only considers auto access.

Frequent and Reliable Transit

In order for transit to become a viable commuting option for suburban workers, it must link to key destinations, run on a timetable that is convenient, and be reliable.

Parking Design and Management

Readily available, low cost, supplies of parking are often a disincentive for workers to carpool or use transit. At a minimum, the configuration of parking should consider pedestrian access. Additional parking minimization, pricing, and management should also be considered.

Travel Demand Management Program

The most efficient Activity Centers also have an effective Travel Demand Management Program. Public and private efforts should be coordinated.

Effective Implementation Program

An Activity Center should not be static; on-going efforts should be made to integrate new ideas and coordinate development activities.

Design Principles for Efficient Suburban Activity Centers

Five physical design principles are identified that should guide the development of new SACs and assist in retrofitting existing SACs. These principles identify the most important features of an efficient Suburban Activity Center. Since every site is different, they should be used as basic guidelines that are tailored to local conditions, rather than hard and fast rules.

Where Can the Design Principles Be Applied?

The Design Principles for Efficient Suburban Activity Centers can be applied in many different types of conditions: urban or suburban, small or large. Three general categories of appropriate sites are:

New Growth Sites: The most straightforward application of the Design Principles will occur on large tracts of raw, undeveloped land (sites over 80 hectares (200 acres) and often 200 to 400 hectares (500 to 1,000 acres)). Typically located at a region's periphery, new growth sites face the dilemma of either promoting urban sprawl or filling a strategic urban development need. Analysis of regional growth patterns, open space resources, and transportation networks should precede site selection. Careful steps should be taken to ensure that sufficient transit service can be provided, that the mix of on-site land uses provides both live-work and convenience shopping options, and that the on-site street network encourages walking, bicycling, and trip linking.

DESIGN PRINCIPLES FOR EFFICIENT ACTIVITY CENTERS

Transit-Oriented Mixed-Use Nodes

Create Walkable Destinations in Activity Centers

Maximize Trip Linking Opportunities

Seek Land Use Synergies

Provide Housing within Activity Centers

Cluster Density and Intensity

Integrate Civic and Recreation Uses

Interconnected and Multi-Modal Street System

Provide Direct Routes to Local Destinations

Create a Pedestrian Scale Block Pattern

Plan for Local and Regional Travel Routes

Use Multi-Modal Street Design

Encourage Traffic Calming

Link Bicycle Routes into Activity Centers

Pedestrian Design and Orientation

Orient Buildings to Streets

Encourage Public Spaces and Sidewalk Activities

Provide Pedestrian and Bicycle Amenities

Frequent and Reliable Transit

Locate Major Transit Stops in Activity Centers

Link Service Levels to Development Intensity

Locate Major Stops in Mixed-Use Nodes

Provide Shelter and Services at Transit

Appropriate Parking Configuration and Minimization

Configure Parking to Balance the Needs of Pedestrians and Cars

Encourage Shared and On-Street Parking

Establish Min. & Max. Parking Standards

Redevelop Surface Lots with Structured Parking

Require Priced Parking

Provide Intercept Commuter Parking

Infill Sites: Many regions have small to mid-sized sites (30 to 80 hectares or 75 to 200 acres) that have been passed over or are ripe for re-use. These sites present opportunities to repair the urban fabric and intensify along existing transit corridors, instead of continuing to expand at a region's edge. Since most infill sites have relatively high land values, a critical mass of office, retail, and residential uses can often be achieved, making a substantial influence on sub-regional travel patterns. Site planning for infill locations should maximize the mix and intensity of land uses, tie into existing or planned transit stations or stops, connect a new street network with existing street systems, and take steps to minimize or manage on-site parking.

Retrofit Sites: Though the most challenging of the three types of sites, retrofit conditions have two distinct advantages: existing available infrastructure and an established on-site employment base. Most existing Suburban Activity Centers fall into this category. Efforts on these sites should focus on improving street and pedestrian networks, broadening the overall mix of activities and land uses, creating mixed-use nodes that are within walking distance of on-site employees, redeveloping strategic sites with structured parking, adding street furniture and public spaces, and incorporating or adding to transit service.

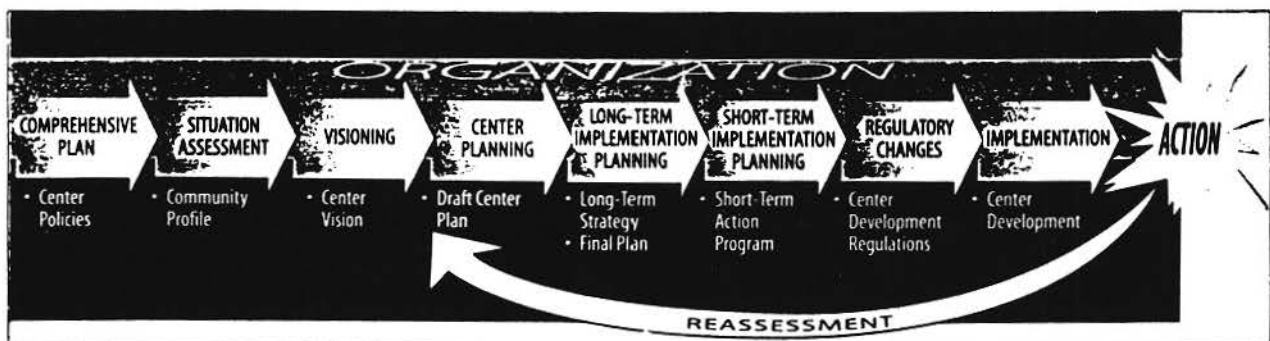
The Implementation Process

Building or redeveloping an Activity Center is an ambitious process that takes places over a long period of time. While its focus is typically physical planning and economics, it is also a process of building partnerships. Neither the public sector nor the private sector has, by itself, all the necessary resources to accomplish the project alone.

Getting the process underway will require a concerted effort by local government and developers, along with support from community leaders, encouragement from regional agencies, and regulatory and financial assistance from federal agencies. The key is to assemble a critical mass of resources, skills, and enthusiasm in which different people with different interests can work as partners toward making a vision into reality.

Implementation Strategies

A series of strategies are presented that can be used to implement the concepts presented in the previous Design Principles section. They are grouped according to the agency or entity most likely to use them: Federal, State, or Local agency. In each case, the strategy or implementation tool is described and, where



The Implementation Process is a reiterative one. Issues and options should be reviewed from all perspectives. From: Developing Your Center: A Step-by-Step Approach, Puget Sound Regional Council.

appropriate, examples are provided to illustrate how they might be applied.

These implementation strategies are intended as a "toolbox" of programs that could be used to encourage efficient centers. They have been culled from regions and communities throughout the country and represent a great diversity of ideas about what has been most successful. Not all programs will be appropriate in every situation. Users should consider this a menu of options from which a locally appropriate comprehensive strategy can be crafted.

Exemplary Activity Centers: Six Case Studies

Six case studies presented:

- Downtown Bellevue, Washington
- Pleasant Hill BART Station Area, California
- Downtown Santa Monica, California
- South Coast Metro, Costa Mesa, California
- Kendall Square, Cambridge, Massachusetts
- Downtown Bethesda, Maryland

Lessons learned from these case studies are summarized below.

Implementation Strategies for Suburban Activity Centers		
Federal	Regional	Local
<ul style="list-style-type: none"> • Intermodal Surface Transportation Efficiency Act • Financial incentives for transit-oriented development • Interagency coordination • Support innovative transit technologies • Incentives for good design 	<ul style="list-style-type: none"> • Integrate land use and transportation in regional plans • Criteria for funding transportation and infrastructure improvements • Design guidelines and model zoning codes • Urban growth boundaries • Regional tax sharing • Transportation demand management programs • Parking management programs • Community visioning & education 	<ul style="list-style-type: none"> • Build local leadership & vision • General plans & comprehensive plans • Zoning • Specific plan areas • Density bonuses • Multi-modal street standards • Alternative parking standards • Design Review • Redevelopment authority • Capital improvement budget priorities • Local shuttle systems • Transportation demand management programs

Downtown Bellevue, Washington

Bellevue's success in achieving high transit use and pedestrian activity demonstrates an entrepreneurial spirit operating at the scale of a growing suburban city. Both public and private sector actions in the City of Bellevue's Central Business District contribute to an increasingly vital pedestrian environment in the downtown and a shift from commuting in single occupancy vehicles to ridesharing and transit.

These shifts are the result of public and private sector actions which have:

- Increased the concentration and intensity of employment and retail uses in the CBD;
- Maintained and increased the diversity of uses in the CBD, including introducing higher density housing;
- Encouraged pedestrian-oriented urban design, with particular attention to the design and intensity of ground floor uses;
- Strictly controlled and priced the supply of parking;
- Provided a clear transit presence in the CBD and public/private TDM programs; and
- Provided financial incentives to discourage SOV commuting and to encourage non-SOV travel behavior.

Pleasant Hill BART Station Area, Calif.

Through pro-active planning efforts and effective transportation demand management programs, significant improvements in transit ridership, and reductions in single occupant vehicle commuting have been achieved at the Pleasant Hill BART Station. Located 48 kilometers (30 miles) east of San Francisco, Pleasant Hill is strategically situated in the center of one of the Bay Area's fastest growing suburban areas. With a direct transit connection to San Francisco via BART's Concord Line, the

area has long been attractive to city-center workers who seek the comforts of suburban living.

Key successful strategies used at the Pleasant Hill BART Station include:

- Aggregation of small parcels to create a cohesive development area for both BART and private property owners;
- Using tax increment financing, facilitated through a Redevelopment Agency, to fund major new infrastructure;
- Preparing a Specific Plan that provided policy and design guidelines for new development on the site; and
- Creating a strong Transportation Demand Management Agency that monitors performance and provides innovative vanpool, shuttle, and ride home services.

Downtown Santa Monica, Calif.

Downtown Santa Monica is an example of sensitive infill, pedestrian-oriented urban design, supplemental local transit service, and a coordinated parking and travel demand management system. Though not as large as many of the other case study sites, Santa Monica is a leader in innovative planning. Key programs that led to these successes include:

- Pro-active planning that revitalized the primary downtown shopping street and transformed it into an entertainment and shopping promenade;
- Extensive local bus system that augments regional service – most residents are within a 400 meter (1/4 mile) of a direct bus connection to downtown;
- Parking standards that encourage fine grain infill and historic building renovation; and
- An aggressive TDM program that exceeds regional requirements.

The conditions Santa Monica faced are not unique – a declining downtown, urban flight,

and intrusive regional infrastructure projects – but, their response was innovative. Downtown has been able to overcome these forces by being flexible in their response to changing conditions. Throughout their efforts, the City has continually worked to modify policies to address emerging trends. They have worked with property owners and business leaders to tailor plans to local conditions. This drive to keep current and locally-specific has allowed the community to create a vital working center that maintains its historic roots.

South Coast Metro, Costa Mesa, Calif.

South Coast Metro's success in achieving marginally higher transit use and pedestrian activity is an example of how regional air quality and congestion management policies can encourage private interests to mitigate the impacts of their developments. Methods used include:

- Environmental impact analysis;
- Development phasing and performance monitoring;
- Trip Fee program; and
- Extensive Public/Private Transportation Demand Management efforts.

South Coast Metro does not, however, represent a model of exemplary land use and urban design. Much of what has been accomplished at this suburban Orange County site is an extension of standard development practices being used throughout the country. While the City and regional agencies have established transportation and air quality management programs that seek to temper the use of automobiles and the developers have provided a mix of uses, the physical pattern of development has limited the area's ability to truly become less reliant on the car.

Kendall Square, Cambridge, Mass.

Kendall Square lies in the neighborhood of East Cambridge and is one of several employment and education centers within the city. The focus of this case study is a 9.7 hectare (24 acre) site located on the Massachusetts Bay Transit Authority (MBTA) Red Line at the Kendall Station, directly across the street from the MIT campus. The Kendall Square area was extensively redeveloped by the Cambridge Redevelopment Agency in the late 1960s as part of a larger urban renewal scheme for East Cambridge. Today, mixed-use development, with over 130,000 square meters (1.4 million square feet) of commercial and office space, is clustered within a quarter mile of the Kendall Square subway stop. The site also boasts impressive travel behavior characteristics: over 20% of Kendall Square employees ride transit to work and an additional 24% walk or ride bicycles for their commute.

Keys to Kendall Square's successes include:

- Redevelopment Agency initiative in the 1960s and 1970s;
- Developer competition for transit-oriented development;
- Modified street system and new pedestrian and bicycle facilities;
- Limited on-site parking;
- City-wide Parking Program;
- City-wide vehicle Trip Reduction Ordinance;
- Privately funded shuttle; and
- Developer and employer-sponsored TDM efforts.

Downtown Bethesda, Maryland

The successes in Downtown Bethesda, both in terms of attracting new mixed-use development and in building in a transit orientation to new improvements, illustrate the power of very focused and directed public agency actions. Through a variety of planning and regulatory efforts, Bethesda has managed to tie together regional transportation goals and local urban design considerations. The result is that downtown Bethesda is among the top five most transit-oriented SACs in the country.

The success of Bethesda in limiting single-occupant vehicle travel can be attributed to a coherent land use and transportation strategy originating in the 1970s:

- The decision to locate in the center of Bethesda the planned Red Line station of the new Washington Metrorail system;
- The creation of a compact central business district around the new station;
- The staging requirement in the 1976 Sector Plan that forced high density development to occur in the immediate vicinity of the Metro station, before lower density development could occur elsewhere in the planning area;
- A strong emphasis on the quality of the pedestrian environment through urban design and streetscape features; and
- A review process for new projects which has authorized development levels above what would normally be supported by the roadway network.

Conclusions

Post-World War II urban development patterns can, in some ways, be characterized as an experiment in free enterprise and local autonomy. The public has given office and commercial developers great latitude to select sites based on low land costs, high visibility, and easy access regardless of the impact on regional travel patterns or proximity to affordable housing. Simultaneously, local governments, in an effort to maintain fiscal solvency, have permitted new developments with little consideration of regional growth patterns, transportation investments, air pollution levels, or quality of life for their citizens.

However, it is not just the siting of major job centers that has had an impact on the livability of our regions, it is also their design. Compounding the fact that most Suburban Activity Centers are located at the periphery of regions or in corridors that are so low density that transit cannot be provided for at any reasonable cost, is the problem that once an employee gets to work, he or she cannot reasonably expect to do anything else without needing a car. Getting a sandwich for lunch, visiting a bank, dropping a child at daycare – all the errands that most working people need to take care of on a daily or at least weekly basis – are only possible via an automobile. Thus, without the option of occasionally walking for some on-site trips, Suburban Activity Centers have become the domain of the car and in some very intensive centers, strangled by congestion.

Tackling the regional problems that have emerged from SACs – excessive congestion, longer commutes, lack of affordable housing, declining air quality, and regional sprawl – will require cooperation at all levels of government,

in partnership with the private-sector, to ensure long-lasting remedies. A few regions have begun this process and, while still in their infancy, they are having mixed results. Perhaps the two most important ingredients for success are: 1) solutions that emerge from a “bottoms-up” consensus-building process and 2) being willing to face difficult choices, such as directing growth toward transit-served corridors and defining limits to regional sprawl.

At a site-specific level, SACs need strategies that transform “edge cities” into integral building blocks of our communities. These centers should be living parts of our cities: places to work, live, and enjoy family and friends. Their physical design, the mix of uses, and how they are managed should create places that are inviting destinations for “civic” life, not just places of commerce. Though newly developed centers present the greatest opportunity to incorporate these concepts, every effort should be made to “recycle” existing centers. Retrofitting auto-oriented places to pedestrian-oriented patterns should be the challenge of the next wave of suburban growth.

Further research on this topic should address the market practicalities of retrofitting SACs, as well as identifying detailed techniques for creating walkable destinations in Activity Centers, improving the interconnected nature of local street systems, integrating transit, and enhancing public outdoor spaces and amenities.

Chapter 1: Introduction

Background & Study Purpose

Since the end of the second World War, suburbia has been the primary venue for residential and office growth in the U.S. and has played a critical role in shaping the quality and character of the country's regions. As growth has moved further from traditional city centers, travel and land use patterns have changed substantially. This study focuses on Suburban Activity Centers (SACs) – a component of suburban growth whereby commercial and employment-generating uses are concentrated into developments whose influence rivals that of a region's downtown. The advent of SACs has not only altered the way regions function, but also has long-term implications for funding and planning priorities.

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Report Focus & Organization

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The report is organized as follows:

Chapter 1: Introduction

An overview of the study and organization of the document.

Chapter 2: The Impact of Suburban Activity Centers

Background on the role of SACs in the development of American regions, as well as a working definition of SACs.

Chapter 3: Previous Research on Suburban Activity Centers

A review of the literature prepared to date on SACs, including travel behavior patterns, suggested methods of retrofitting auto-oriented SACs, and alternative planning and design methods such as Transit-Oriented Development and Travel Demand Management.

**Chapter 4: Features of an Efficient
Suburban Activity Center**

The research demonstrates that a mix of quantitative and qualitative factors should be combined to create more efficient Activity Centers. This section identifies physical design and management elements.

**Chapter 5: Redefining SACs –
Design Principles for Efficient Suburban
Activity Centers.**

A series of physical design principles that can be used to plan new Activity Centers, retrofit an existing center, or review plans for a proposed project.

Chapter 6: Implementation Strategies

A menu of tools to implement the concepts presented in Chapter 5 are described. They are organized according to the entity most likely to use them: Federal, State, or Local agency.

Chapter 7: Case Studies

Six Activity Centers are analyzed that are considered "exemplary." Factors that were considered keys to their success are identified.

Chapter 8: Conclusion

Summary remarks and next steps.

Bibliography

Data and research resources are listed.

A subsequent volume will focus more extensively on retrofit strategies for SACs. Three case studies will be examined and illustrations will be presented showing how the design principles could be applied.

Chapter 2: The Impact of Suburban Activity Centers

The Evolution of Suburbia

Many of the travel behavior problems associated with Suburban Activity Centers stem from the relationship of land use patterns, urban design characteristics, and the local and regional street system. To understand the role SACs play in planning decisions today, a look at the evolution of suburbia is appropriate.

The first stage of suburbanization in the United States began with the "streetcar suburbs." Fed by radial transit lines that allowed residents of new neighborhoods to easily commute to central city jobs, these pre-World War II neighborhoods were typically fashioned around a gridded street system. Their tie to transit allowed an urban fabric that was scaled to the pedestrian – shops, housing, parks, and employment centers were all within a comfortable walking distance of a streetcar stop.

Following World War II the widespread availability of the automobile, development of the Interstate Highway System, initiation of Federal Housing Administration low interest home mortgage loans, economic prosperity, and the baby boom fueled exponential suburban growth and led to new patterns based primarily on easy auto accessibility (FHWA 1992). The resulting changes in street standards eventually led to ever larger retail centers designed for auto, rather than pedestrian convenience (Handy 1993). Soon regional shopping malls became the "downtowns" of suburbia and strip centers provided for everyday needs.

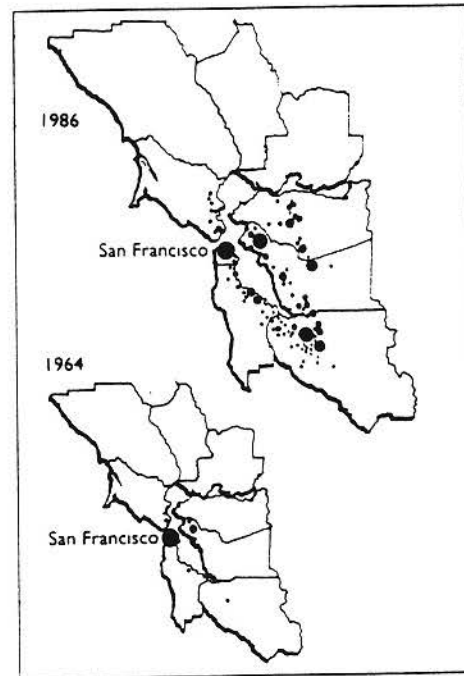


Figure 1: Changing Distribution of Bay Area Office Space

The mid-70s brought substantial changes to the suburban landscape. Heretofore, jobs were concentrated in central cities. Now, evolution to a service economy, easy auto accessibility, low land and development costs, telecommunication advances, and increased use of trucking for shipping, brought an explosion of new office space to the suburbs (Leinberger 1986). In fact, since 1970 it is estimated that 80 percent of new office space has been built outside of central business districts (FHWA 1992). This decentralization of jobs encouraged suburban sprawl by accommodating the desire

to build low density, upper middle income housing within commute distance of new office complexes. Thus, regions throughout the country expanded limitlessly to fulfill this demand.

The 80s and 90s coalesced commercial suburban growth into major conglomerations of high rise office towers, major retail complexes, and an occasional condominium complex. This trend toward concentration of uses was driven by the need to create a sufficient market base to support the ever-increasing size of commercial retail developments. For example, about 250,000 people must be located within a five-to-eight kilometer (three-to-five mile) radius to support a modest regional mall and roughly 250,000 square meters (2.5 million square feet) of office space is needed to support a 250-room hotel (Leinberger 1986). Easy freeway access at many suburban new growth sites also fueled this boom. Thus, as market factors came into

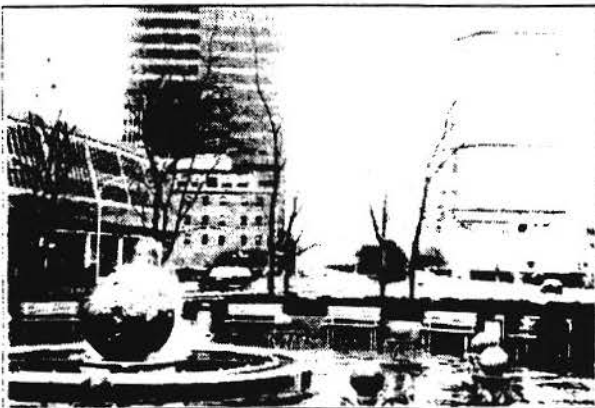


Figure 2: Suburban Activity Centers now rival the scale and magnitude of many region's downtowns.

play, new "edge cities" were created at the periphery of regions.

What is a Suburban Activity Center?

The advent of Suburban Activity Centers has had a radical effect on the shape and function of regions throughout the country. These centers are typically made up of large concentrations of office space, retail uses, and more recently, light industrial and manufacturing facilities. Very few Suburban Activity Centers include significant residential components, much less parks, schools, and other civic buildings. While SACs come in many sizes and shapes, there appear to be a number of distinctive common characteristics:

- enough employment-generating uses to rival the region's downtown;
- region-serving commercial uses that draw patrons from the surrounding suburban communities;
- an employment destination, rather than a bedroom community; and
- located adjacent to major transportation facilities, such as freeway interchanges or transit hubs (Garreau 1991; Leinberger 1986).

While the term "edge city" has often been used to characterize substantial concentrations of new suburban commercial growth (Garreau 1991), SACs are not always edge cities. Although most recent suburban growth has occurred on undeveloped property at the edge of regions and at the crossroads of major freeways, close-in suburbs that may have once been a small town or a stop on the subway have also garnered their share of office and retail growth. Thus, for the purposes of this study, Suburban Activity Centers shall comprise both inner suburb and edge city conditions (FHWA 1992; Leinberger 1986).

Suburban Activity Centers and their Impact on Regions

The impact of SACs on the function and character of regions has been enormous. The decentralization of jobs has direct implications on the capacity of regional roadway networks, viability and configuration of transit systems, sustainability of downtowns, housing affordability, and an increasing orientation toward the car to the exclusion of pedestrians and other non-auto modes. As SACs mature, it is becoming clear that local and regional congestion is stifling the accessibility that made these centers attractive to begin with. This has triggered an unending cycle of regional expansion as developers hopscotch to outlying locations where land is cheaper and commuting is easier (Leinberger 1986; Handy 1993).

Siting decisions by developers and employers are not the only contributors to regional sprawl. Our suburbs are designed around a stereotypical household which is no longer predominant. The size of households has been shrinking, from an average of three twenty years ago to two and a half today. The percentage of singles and single-parent families is increasing, from 29 percent twenty years ago to 44 percent today. Of the approximately 17 million new households formed in the 1980s, 51 percent were occupied by single people and unrelated individuals, 22 percent by single-parent families, and only 27 percent by married couples with or without children. People over 65 made up 23 percent of those total new households. Households with children typically now have two workers. Married couples with children now represent only 26 percent of the households, down from 40 percent a generation ago (U.S. Bureau of the Census 1990).



Figure 3: As prime sites are developed, suburban growth extends to outlying "rings," leaving underutilized lands within the urban area. Leinberger 1986.

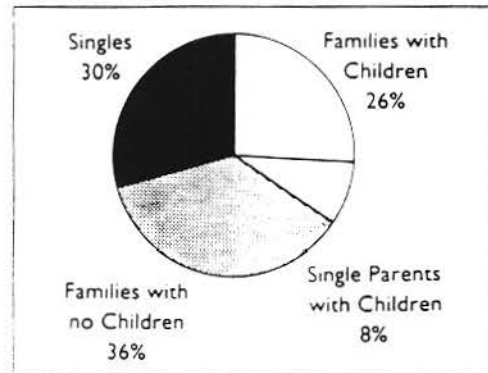


Figure 4: Household Composition: 1990.
Source: U.S. Bureau of the Census.

The economics of the household has also changed. Working mothers are becoming the norm with double-income households now representing 54 percent of all families (U.S. Bureau of the Census 1990). Women are less available to support a suburban family lifestyle which requires a chauffeur for every child's trip. With these economics, the traditional large-lot single-family residence is accessible to fewer and fewer people. Add to this the escalating cost of housing and the needs of working women, and the possibility of realizing the old

American Dream with existing development patterns becomes increasingly unlikely.

Even double-income families now find home ownership a troublesome, if not unattainable, goal. With affordable housing growing ever more elusive, families have to move to cheaper but more distant peripheral areas, often consuming irreplaceable agricultural land and overloading roads with long commutes. In 1970 about half of all families could afford a median-priced single-family home; today less than a quarter can (Center for the Continuing Study of the California Economy 1992). The lack of moderately priced housing near Suburban Activity Centers prohibits a large number of clerical and service industry employees from residing near workplaces and they must now commute long distances to work (Loukissas 1990).

Traffic congestion in the suburbs is a signal of this deep shift in the structure of our economic culture. Where travel to downtown employment once dominated, suburb-to-suburb traffic patterns now produce greater commute distances and longer driving time. Over 40 percent of all commute trips are now from suburb to suburb (Cervero 1986). These new patterns have seriously eroded the quality of life in formerly quiet suburban towns. In the San Francisco Bay Area, for example, as in many metropolitan areas around the country, 341 kilometers (212 miles) of the region's 1,306 kilometers (812 miles) of suburban freeway are regularly backed up during rush hours. That figure is projected to double within the next 12 years (MTC 1993). As a result, recent polls have traffic continually heading the list as the primary regional problem, followed closely by the difficulty of finding good affordable housing (Bay Area Council 1991).

Congestion and high housing costs are not the only economic measure of the cost of sprawl. American employers – public and private – face compensation demands that reflect high transportation and housing costs. Worker productivity slides with congestion and long commutes. Raw material and product movement is costly and uncertain. Air quality standards often restrict industrial growth as pollution from cars “uses up” the air shed. Add to these factors the time cost of getting a building permit for expansion or new facilities and the lack of coordination among local jurisdictions, and a region's ability to maintain a healthy job base erodes.

In response, some SACs have instituted employer-based travel demand management programs, such as parking pricing and carpool programs, to reduce local and regional traffic congestion (Hooper 1989). Others have explored the feasibility of adding pedestrian and transit improvements, such as sidewalks or bus stop benches (Cervero 1991). It is becoming increasingly clear, however, that these measures, by themselves, are not sufficient to effect long-term change in travel behavior, nor do they fully address the regional implications of this pattern of growth. Land use strategies that reduce vehicle miles traveled (VMT) and the number of vehicle trips, as well as increase walking, bicycling, and transit mode shares are now being considered key components in a more comprehensive strategy to improve the quality of individual SACs. Beyond this, the structural relationship between regions and the placement of SACs needs to be addressed in order to ensure the sustainability and livability of regions.

Chapter 3: Previous Research on Suburban Activity Centers

Suburban Activity Centers: Experiences, Problems, and New Strategies

This literature review is intended to provide an overview of the most recent and relevant studies pertaining to the subject of SACs, as well as identify alternative land use and circulation patterns that could be used as strategies for designing new or retrofitting existing SACs. It is not an attempt to provide an exhaustive review of literature; rather a relatively focused effort to identify research that may have relevance to the specific question of how to design SACs so that they minimize traffic congestion, improve pedestrian, bicycle, and transit mode shares, and contribute to healthy regions.

This report goes beyond the research that has been conducted to date on SACs. It makes the assumption that new strategies, particularly those that purposely link transportation and land use planning, are necessary to make substantial inroads into current problems with SACs. As Suburban Activity Centers have become an acknowledged component of regional growth, a body of literature has emerged which specifically analyzes their form and function. The majority of these studies focus on describing the travel patterns of local employees and characterizing the relationship between these travel patterns and site-specific design features. A few selected studies offer and test strategies for retrofitting existing SACs, primarily through the introduction of street and pedestrian improvements. Few studies,

however, specifically address linkages between topics (land use, travel behavior, travel demand management) as they relate to SACs.

Suburban Activity Center Travel Behavior

The reliance of SAC employees on the automobile for virtually all workday trips has been a significant focus of the research prepared to date. Travel behavior – the way we choose to get around, the frequency of trips, and the distance of each journey – is the most common measure of this entrenched dependence on the car. Cervero (1986) documented the effects of rapid suburban office growth during the 1980s on travel behavior, finding that most low density, single-use, campus-style office parks with abundant free parking averaged transit mode shares of less than two percent. Hooper's (1989) study of six mixed-use SACs across the U.S. also confirmed an entrenched reliance on the auto among SAC employees. In five out of the six sites that were surveyed an average of over 87 percent of persons employed in SACs commuted in single-occupant autos and only 7 percent carpooled. Travel behavior in Bellevue, Washington, the only SAC surveyed with an extensive radial transit system, varied significantly from this trend. Here, overall transit ridership for work trips was close to 9 percent, carpooling represented 17 percent of all work trips, and single-occupant autos only 73

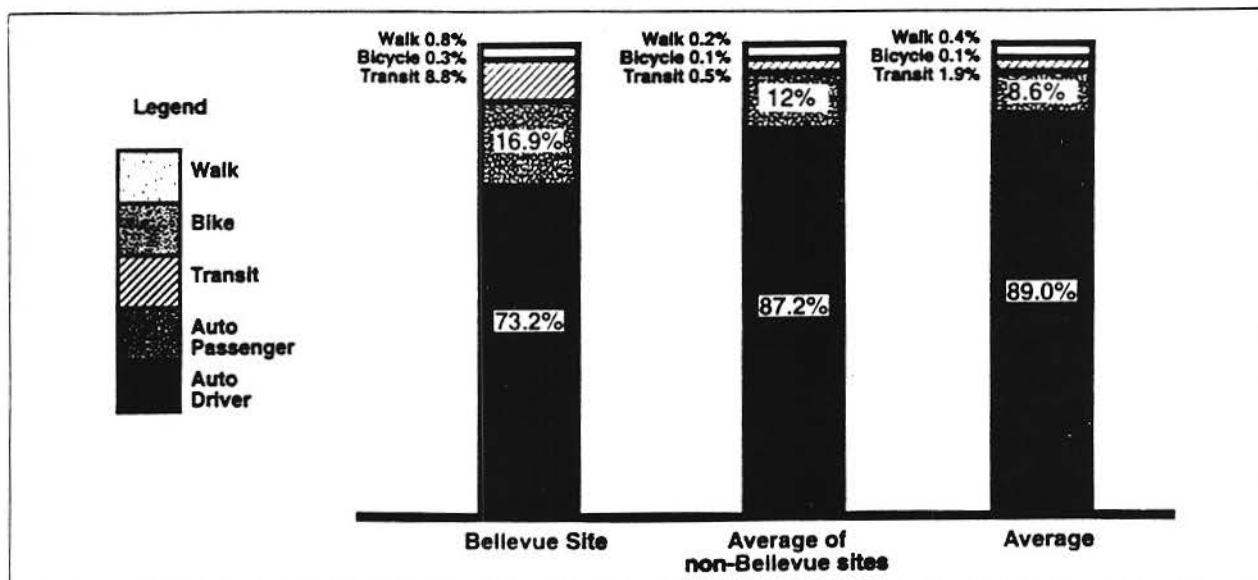


Figure 5: Peak Hour Work Trip Mode Splits at Large Scale Suburban Activity Centers. Source: Hooper 1989

percent. Non-auto mode shares were even higher in selected office projects where parking restrictions and pricing programs were in place. In a comparison of travel behavior within SACs and central business districts, Loukissas (1990) found that central business district workers are five times as likely to use transit and carpool at least 5 percent more often than SAC employees.

The root cause of auto dominance in SACs is grounded in a number of factors. As Cervero (1986) found in single-use office parks, mixed-use SACs with ample supplies of free parking also have high auto mode shares (Hooper 1989; Loukissas 1990). An absence of frequent and reliable transit service to suburban workplaces and SACs necessitates the use of the automobile for commute trips (Hooper 1989). In many regions suburb-to-central city transit systems continue to dominate, despite the increasing demand for suburb-to-suburb service (Cambridge Systematics et al 1992). Providing SACs with radial transit service focused on a centralized transit center could increase transit usage to as much as 6 percent of all trips and

would noticeably reduce local traffic congestion (Hooper 1989). However, providing adequate inter-suburban transit service may be difficult as long as suburban residential densities remain relatively low and dispersed (Loukissas 1990).

Hooper's (1989) study of SACs documented the extent of trip-making made by employees which is not between home and work. As many as 79 percent of SAC office employees make "intermediate trips" either to or from work or at midday. However, the primary mode of transportation for internal trips is still the automobile. The data suggested that commuters prefer their single-occupant autos not only for comfort and privacy, but also for the real needs of making intermediate stops either along the way to work, from work, or during the middle of the day. Daily "errands," such as dropping a child at daycare or school, shopping, meals, banking, social and recreational trips, and work-related activities are the driving force behind workers needing cars during the day. Thus, capturing these types of trips within the SAC and making these uses accessible via

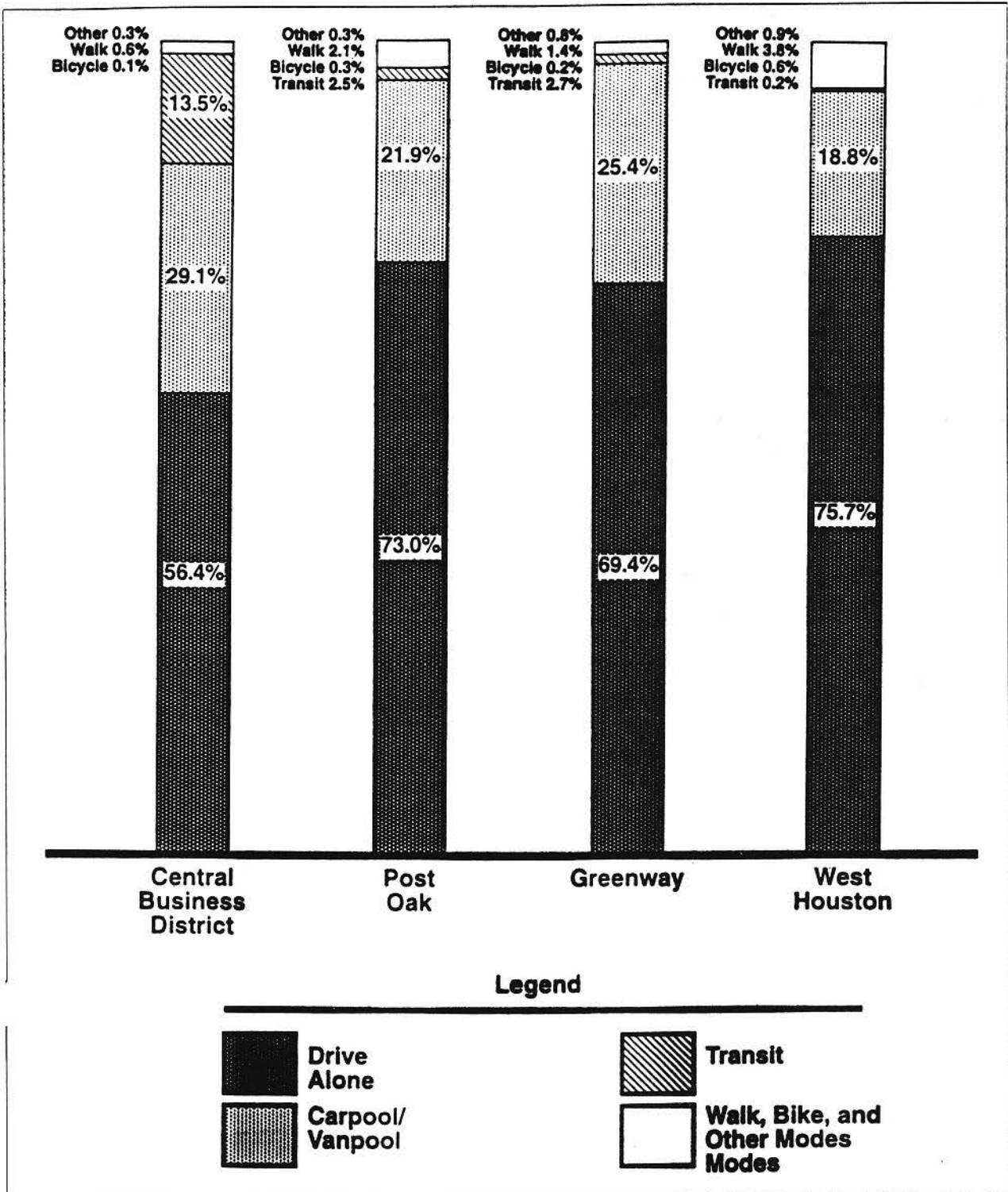


Figure 6: Mode of Travel to Work at Major Activity Centers in Houston Area. Source: Loukissas 1990.

transit, carpool, or walking could provide realistic alternatives to auto commuting. Hooper also found that internalization of trips tends to increase with the size of the SAC and with the extent of competing retail activities located outside the boundaries of the SAC; a higher proportion of intermediate trips were taken within the SAC where relatively little retail activity existed outside the boundaries of the SAC. Cervero (1988 and 1991) confirmed Hooper's (1989) findings regarding the degree to which employees in SACs make intermediate trips. In his study of 57 sites throughout the country he found that SACs with high employment densities and a variety of land uses have greater shares of their workers commuting via carpools, vanpools, and buses. On-site and near-site retail services, like restaurants, shops, and banks, were found to be especially important in luring suburban workers out of their cars.

Employment densities are also a critical factor in influencing local traffic conditions. SACs with the highest employee densities were found to have the slowest average commute speeds, the most congested local streets and freeways, and the highest proportion of ridesharing, transit usage, and pedestrian travel (Cervero 1988 and 1991). While high employee densities encourage ridesharing and alternate modes of travel, they also generate high volumes of traffic which can saturate thoroughfares. This is perhaps in part due to the configuration of streets within SACs; most SACs lack an interconnected internal street system and thus force all local and through traffic onto a limited number of arterial streets. Such street patterns are starkly contrasted with those of central business districts which accommodate through traffic on peripheral freeways (Loukissas 1990).

The degree to which housing is integrated into SACs can also affect its travel behavior. SACs with a more even balance of jobs and housing tend to have less congestion on connecting or external roadways. In his analysis of U.S. SACs, Cervero (1988) found that sites with some on-site housing averaged between three to five percent more commute trips by walking, bicycling, and transit than centers without on-site housing. Jobs-housing mismatches appear to be most common in areas with large shares of employees in clerical, sales, and other moderate-salary positions. Nearby housing in these settings tends to be too expensive for low and moderate income households (Cervero 1988).

Even if all the land use components are present to make a well-balanced mixed-use development, SACs are forced to operate on the automobile scale due to the pattern of development. Buildings are typically surrounded by vast expanses of surface parking and street patterns create large "superblocks" of impenetrable space. This type of environment is hostile to pedestrians. Development that combines auto-scale and pedestrian-scale would discourage auto use for short trips, such as lunch or errands, and would encourage pedestrian trips for these purposes (FHWA 1992). Pedestrian access between buildings could be improved by clustering different uses in close proximity and connecting building sites with pedestrian pathways (Hooper 1989). However, simple "fix it" solutions, such as adding bus stops or sidewalks, are not sufficient to substantially influence mode split and encourage significant percentages of non-auto trips (Cervero 1991).

Part of the SAC transportation problem also stems from the lack of coordination between local and state governments in terms of linking

land use planning (local responsibility) and transportation planning (regional routes are typically planned by State agencies). Additionally, SACs developed at the periphery of regions are often not governed by traditional local public agencies; governance or control of SACs is usually by a group of stakeholders – often employers (FHWA 1992).

Emerging Strategies

A study of pedestrian facilities within SACs (JHK 1987) found that the scale and number of actors involved in the development of SACs requires a greater public agency involvement in design coordination, control, and financing to assure that pedestrian facilities are adequately provided. The study also concluded that pedestrian planning cannot be conducted in isolation from other planning elements, such as land use and highway design. Rather, planning for the pedestrian must be integrated with the entire process of planning, design, and implementation by both the public and private sectors. For example, one of the most significant problems with providing sidewalk continuity in an SAC is the lack of coordination between property owners and the uneven staging of development. As development takes place over time and sidewalks are developed only on the frontage of developed properties, gaps in the pedestrian network emerge. The study recommends that public agencies intervene to provide interim network links.

The JHK study also found that pedestrian activity is dependent on the density of development. In a comparison of two SACs: Bethesda, Maryland and Tysons Corner, Virginia, the floor area ratio (FAR) of Bethesda was four times that of Tysons Corner and the

Bethesda SAC had 10 times more pedestrian activity.

Other recommendations of the JHK study included:

- provide wide sidewalks on the frontage of every building;
- provide pedestrian connections between major origins and destinations (this may require introducing mid-block passageways or interior building connections in sites that are already developed);
- provide crosswalks at all pedestrian street connections, including mid-block passageways;
- provide open space to accommodate pedestrian activities, such as pocket parks, small plazas, benches, and other amenities;
- introduce medians on all arterial streets where pedestrians will cross;
- provide for structured parking as often as possible; and
- in newly developing SACs concentrate as much development as possible in a compact central core and develop satellite centers within a short transit connection.

Since the JHK study was published, several existing SACs have studied the feasibility of introducing specific land use, roadway, and transit features to reduce traffic congestion and improve commercial viability. As part of this effort, case studies were reviewed for Tysons Corner, Virginia (EDAW, Inc. et al 1989; KRS et al 1992), Uptown Houston, Texas (Harris County Improvement District 1991), and Parole, Maryland (Edge City Group et al 1994). They found many of the same problems identified above, but also raised a number of additional concerns and possible solutions, including:

- Traffic congestion is one of the primary threats to an SAC's competitiveness and quality of life. Commercial competition from nearby centers is also a major factor in

-
- the viability of SACs. Land uses should be densified and diversified to create a well-rounded 24-hour community, as well as address traffic congestion problems. This will require additional housing, services, retail, public institutions, and open space (EDAW, Inc. et al 1989).
- Housing is also seen as a major factor in revitalizing SACs and creating a "built-in" market for on-site retail and services (EDAW, Inc. et al 1989; KRS et al 1992; Harris County Improvement District 1991; Edge City Group et al 1994).
 - To encourage walking for some trips, the scale of SACs should be broken into a series of distinct districts and neighborhoods of walking scale, each with their own center and a fine grain mix of uses. One approach proposed for Tysons Corner is to create a series of walkable, highly concentrated districts (major activity centers) that are interconnected by a local transit system (KRS et al 1992).
 - Internal street systems need to be enhanced, interconnected, and designed for the pedestrian. Transit systems can be introduced to an SAC as both a means of travel and as an amenity to the commercial component (EDAW, Inc. et al 1989; KRS et al 1992; Harris County Improvement District 1991; Edge City Group et al 1994).
 - Incentives need to be provided to entice developers to make site plan and land use modifications, as well as reduce the amount of parking that is provided (Edge City Group et al 1994; KRS et al 1992).
- Regional planning should address traffic and growth of SACs and reduce pressures for sprawl (EDAW, Inc. et al 1989).
 - SACs should be considered within the context of the larger metropolitan area and planned as a series of regional satellite centers. Suggestions on how to refocus on the metropolitan area as a whole include:
 - consider metropolitan growth boundaries;
 - designate boundaries around edge cities;
 - focus on transit;
 - modify parking and parking requirements;
 - reinvigorate commuter rail into downtowns;
 - focus investment in downtowns; and
 - officially recognize metropolitan areas as the fundamental economic unit, rather than individual cities or developments (FHWA 1992).

Transit-Oriented Development: Responding to the Problems of Suburban Activity Centers

Given the extent to which SACs are dominated by auto congestion and a forced reliance on the car, alternative patterns, such as transit-oriented development, are seen key components to any comprehensive rethinking of SAC patterns.

Transit-Oriented Development Concepts

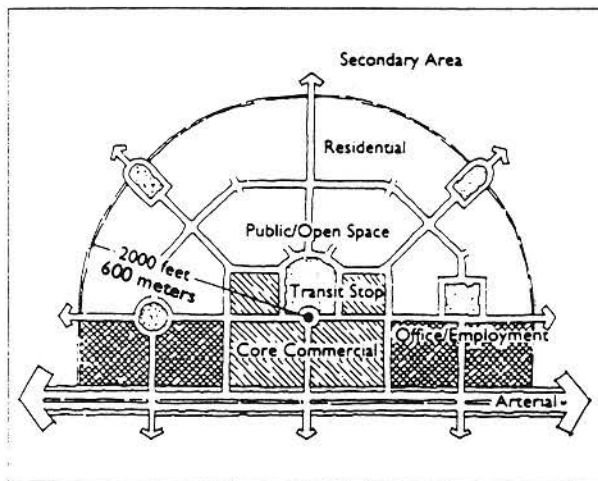


Figure 7. Transit-Oriented Development (TOD).
Source: Calthorpe (1993).

The Transit-Oriented Development (TOD) concept is simple: jobs, moderate and high-density housing, retail and services, and complementary public uses are concentrated in mixed-use developments at strategic points along the regional transit system. The mix and proportion of land uses varies by place and market demand. The scale of development is tied to the pedestrian.

Similar concepts have gone by many names: Pedestrian Pockets, Traditional Neighborhood Developments, Urban Villages, and Compact Communities to name a few (Kelbaugh 1989;

Duany and Plater-Zyberk 1991; Calthorpe 1993). Although different in detail and emphasis, these concepts share a common perspective and similar design principles oriented toward reducing reliance on the automobile. TODs add emphasis to the integration of transit on a regional basis, providing a perspective missing from strategies which deal primarily with the nature and structure of individual communities and neighborhoods. This regional perspective helps to direct growth away from distant sites served only by highways. Transit is not the only goal of these development patterns, it adds to a strategy with many other benefits.

A "walkable" environment is perhaps the key aspect of the TOD concept. In order to develop alternatives to drive-alone auto use, comfortable pedestrian environments should be created at the origin and destination of each trip. No one likes to arrive at work without a car if they cannot walk comfortably from transit to their destination or run a mid-day errand on foot, as evidenced by the previously mentioned studies of SACs (Hooper 1989; Cervero 1988). TODs seek to bring many destinations within walking distance, allowing trips to be combined. Placing local retail, parks, day care, civic services, and transit at the center of a TOD reinforces the opportunity to walk or bike for many errands, as well as combine a trip to transit with other stops. Streets lined by trees and building entries also help to make the TOD environment "pedestrian-friendly." Although focused on reinforcing transit, such land use configurations would equally support carpools and more efficient auto use (Calthorpe 1993).



Figure 8. The design and mix of uses in a TOD should be pedestrian-oriented and market-wise.

More walkable communities can help relieve dependence on the auto in many ways other than just transit. Reducing trip lengths, combining destinations, carpooling, walking, and biking are all enhanced by TODs (Kulash 1990; Holtzclaw 1991; Parsons Brinkerhoff et al 1993; Fehr & Peers 1992; Chellman 1991; Ewing et al 1994; Lerner-Lam et al 1993). A healthy walking environment can succeed without transit, but a transit system cannot exist without the pedestrian. The growth of pedestrian-friendly developments, if coordinated at a regional scale, can form the armature for future transit growth. In fact, this type of development must precede, not just follow, the growth of transit networks. TODs can exist without transit, but transit systems have little chance of surviving in the low-density environment of sprawling suburbs without TODs (Loukissas 1990).

The fundamental structure of the TOD is nodal – focused on a commercial center, civic uses, and a transit stop. This nodal quality is the result of the contemporary bias of retail to develop in distinct “packages,” the spacing requirements of transit stations, and the qualitative need for an identifiable social center in neighborhoods and districts (Calthorpe 1993). This is in sharp contrast to the linear form which used to dominate the form of grid towns and now dominates strip commercial suburbs and many SACs. Defined by a comfortable walking distance (400 to 800 meters or 1/4 to 1/2 mile), the TOD is made up of a core commercial area, with civic and transit uses integrated, and a flexible program of housing, jobs, and public spaces surrounding it. The densities and mix of these primary uses is determined by the specifics of each site and its economy. Lower density, more auto-dependent uses, are located beyond the transit-oriented node.

There are many “mixed-use” Planned Unit Developments and Master Planned Communities which speak of similar goals but employ fundamentally different planning principles. These strategies differ from TODs in several significant ways. First, they typically have a mix of uses but separate these uses into individual development zones segregated by major arterial roadways and property lines. This segregation often makes walkable connections weak. Second, they tend to isolate the pedestrian from the street, either on greenways or designated paths, leaving the street solely for auto use. They employ a street system that forces all traffic onto the arterial network. Third, they design local streets for the convenience and speed of autos, rather than for pedestrians, bicyclists, and cars. And finally, they facilitate an architecture of autonomous “objects,” rather than an architecture which helps define and create memorable public places.

TODs not only promote alternatives to auto use, but can be a formula for affordable communities – affordable in many senses. Communities are affordable to the environment when they efficiently use land, help to preserve open space, and reduce air pollution; they are affordable for diverse households when a variety of housing types, at various costs and densities, are encouraged in convenient locations; they are affordable to families with limited incomes when the mix and configuration of uses allow reduced auto dependence and auto-related expenses; they are affordable to businesses seeking to relocate when the workforce can be freed of the gridlock and high housing costs typical in many growing metropolitan regions; and they are affordable to the public taxpayer when infrastructure is efficient, and public amenities are well-used.

In summary, the principles of Transit-Oriented Development are to:

- organize growth on a regional level to be compact and transit-supportive;
- place commercial, jobs, housing, parks, and civic uses within walking distance of transit stops;
- create pedestrian-friendly street networks which directly connect local destinations;
- provide a mix of housing types, densities, and costs;
- preserve sensitive habitat, riparian zones, and high quality open space;
- make public spaces the focus of building orientation and neighborhood activity; and
- encourage infill and redevelopment along transit corridors within existing neighborhoods.

To date, few models of TOD have been designed at the scale of SACs. It is the assumption of this study that many of the ideas posed by the proponents of TOD can be reasonably applied to SACs.

TODs and Travel Behavior

Central to the utility of these TOD concepts is their implications on travel behavior. Though many factors other than land use configurations affect travel behavior – such as the cost of gas, auto ownership, parking availability and cost, the amount of time lost to congestion, and the quality of transit – the effects of land use on travel behavior are formative. Calthorpe (1993) postulates that land use patterns are the foundation upon which the viability of these cost, time, and investment factors depend. If a land use pattern primarily supports auto use, then increasing the costs of operating cars and allowing congestion to grow will only result in

frustration, not a fundamental reorientation of travel behavior. On the other hand, if land use configurations support alternatives to the car, then many results are possible: people may choose to walk, bike, and use transit more often; they can combine trips more easily; there may be shorter, more direct routes to local destinations; they may be able to reduce the number of cars they own; and because of these other changes, reduced congestion on highways and arterial roadways is possible.

A number of studies have been prepared which examine the travel behavior characteristics in neighborhoods with many of the characteristics of transit-oriented developments, such as interconnected street systems; clustered shopping, civic, and recreational uses; and placement of high density uses near core commercial areas and transit stops. The reports that were reviewed may or may not be conclusive in their methodology or results. They do however paint a consistent picture:

- higher mode split to walking and bicycling, as well as transit ridership (Fehr & Peers 1992; Chellman 1991; Ewing et al 1994; Parsons Brinckerhoff et al 1993);
- increased combining of trips to reduce the overall number of trips and save time

(Fehr & Peers 1992; Kulash 1990; Ewing et al 1994);

- shorter, more direct routes to local destinations (Kulash 1990; Holtzclaw 1991; Parsons Brinckerhoff et al 1993);
- reduced vehicle kilometers/miles traveled (Parsons Brinckerhoff et al 1993);
- reduced auto ownership (Holtzclaw 1991; Parsons Brinckerhoff et al 1993);
- slower speeds on local streets (Kulash 1990);
- reduced congestion on collector and arterial roadways (Kulash 1990); and
- reduced household cost for auto ownership and usage (Holtzclaw 1991).

However, others find that the positive indications of transit-oriented development planning are less clear, given that most developments specifically designed to promote transit usage and walking are still in the planning stages. Thus, little empirical data is available (Cervero 1993).

Although few of the new generation of TODs have matured to a stage to answer these questions directly, neighborhoods with similar characteristics – typically built before W.W.II – may offer a reasonable comparison. One such study by Fehr & Peers Associates (1992)

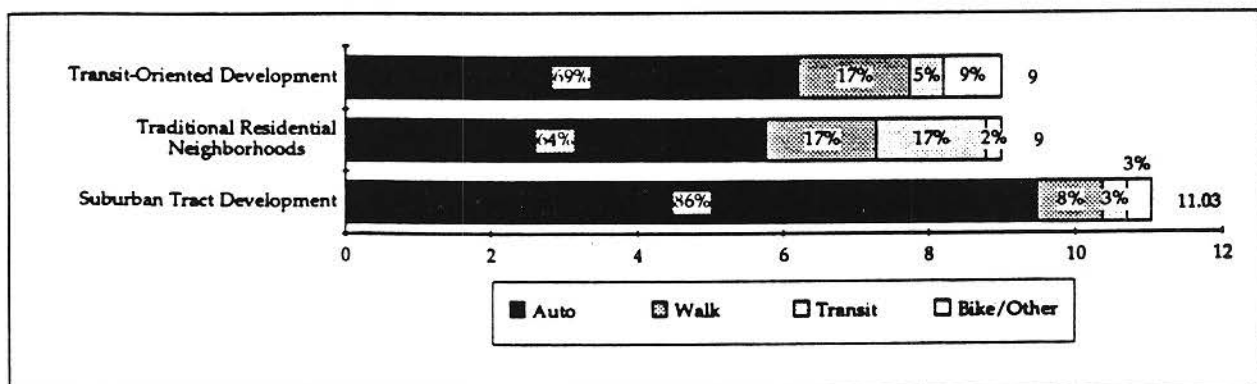


Figure 9: Daily Trip Generation By All Modes in the San Francisco Bay Area, 1980 MTC Surveys. Source: Fehr & Peers Associates, Inc.

compared older TOD-like neighborhoods in the San Francisco Bay Area with some of its newer suburban areas. These older neighborhoods were not inner-city locations with high densities, but the older centers of small towns throughout the region. Taken from travel surveys conducted in 1980, the results showed both a significantly lower number of trips per household (nine in the TOD-like neighborhoods vs. 11 in the new suburbs) and a dramatic shift in the mode split. Auto trips were 86 percent in the suburbs while only 64 percent in older neighborhoods. Walking and bike trips were 19 percent for the older neighborhoods and 11 percent in the suburbs. The transit trips in the older neighborhoods accounted for 17 percent of the total vs. only 3 percent in the suburban areas. A similar survey in Portland, Oregon showed that walking trips in the older, mixed-use neighborhoods were three times those of the typical suburb (Parsons Brinckerhoff et al 1993).

Chellman (1991) found evidence that trip generation rates of traditional-style developments are substantially below the norm. Using trip data compiled for two traditional neighborhoods in Portsmouth, New Hampshire, the author found the average daily traffic (ADT) generated by these neighborhoods to be approximately 50 percent lower than the ADT predicted by the Fifth Edition of the ITE Trip Generation Manual.

In another empirical study done by Holtzclaw (1991) in the San Francisco Bay Area, odometer readings were aggregated by neighborhood type and location. The TOD-like neighborhoods had almost half the vehicle kilometers/miles traveled per household per year of the new suburbs; 25,260 kilometers vs. 50,360 (15,700 miles vs. 31,300). Using the cost per kilometer (mile) developed by Hertz

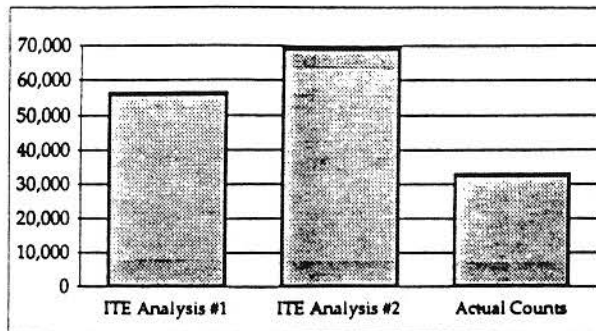


Figure 10: Actual Counts vs. ITE Trip Generation Projections, Average Daily Traffic. Source: Chellman 1991.

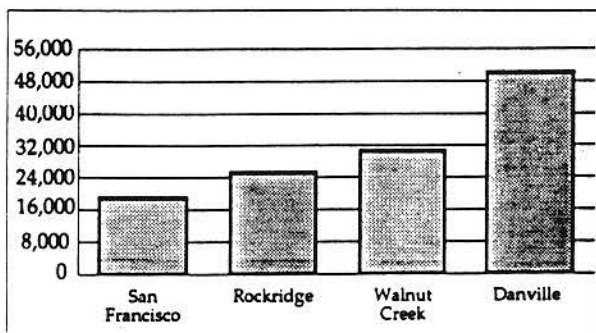


Figure 11: Vehicle Kilometers Traveled per Household. Source: Holtzclaw 1990.

Corporation in 1987 of \$0.35 (\$0.57/mile), this difference represented a savings of \$8,892 per year for the average household in a TOD-like neighborhood. There were several factors other than land use configuration which affected this dramatic shift for the older neighborhoods. Lower average household incomes, better transit service, and closer proximity to the metropolitan center all characterized the older neighborhoods. New TODs may not be able to match the proximity and they may have slightly higher average incomes than the older neighborhoods, but they should have equivalent transit service and similar land use diversity and density. Even if new TODs cannot exactly replicate the performance of these older neighborhoods, the numbers indicate a possible range of results that are very promising. And

they are, in cultural nature, and public policy, specific to America.

One of the more interesting studies of the influence of land use patterns on the extent to which people will walk to local destinations and transit is a report prepared by Parsons Brinckerhoff, et al (1993) as part of the 1000 Friends of Oregon "Making the Land Use, Transportation, Air Quality Connection (LUTRAQ) Study." The objective of this study was to test the hypothesis that travel behavior is influenced by physical characteristics of neighborhoods, in particular by the quality of the pedestrian environment. The study used data from the 1985 Portland, Oregon Metro home interview survey and the regional travel forecasting model to evaluate the validity of a proposed computer model modification, the "Pedestrian Environmental Factor (PEF)." The PEF is a composite of four neighborhood attributes: ease of street crossings, sidewalk continuity local street characteristics (grid vs.

cul-de-sac), and topography. It serves as a measure of an area's propensity towards walk and transit mode shares.

The LUTRAQ study found that:

- residents in neighborhoods with higher density, proximity to employment, grid pattern streets, sidewalk continuity, and ease of street crossings tend to make more pedestrian and transit trips;
- households in areas with high PEF values make over three times as many transit trips and four times as many walk and bicycle trips as households in areas with lower PEF values;
- residential density is directly proportional to non-auto mode choices; the higher the density, the higher the walk, bicycle, and transit mode shares;
- the closer a household is to employment activity and/or the better the transit service is to major employment centers, the greater the transit and walk/bicycle shares of all household trips;

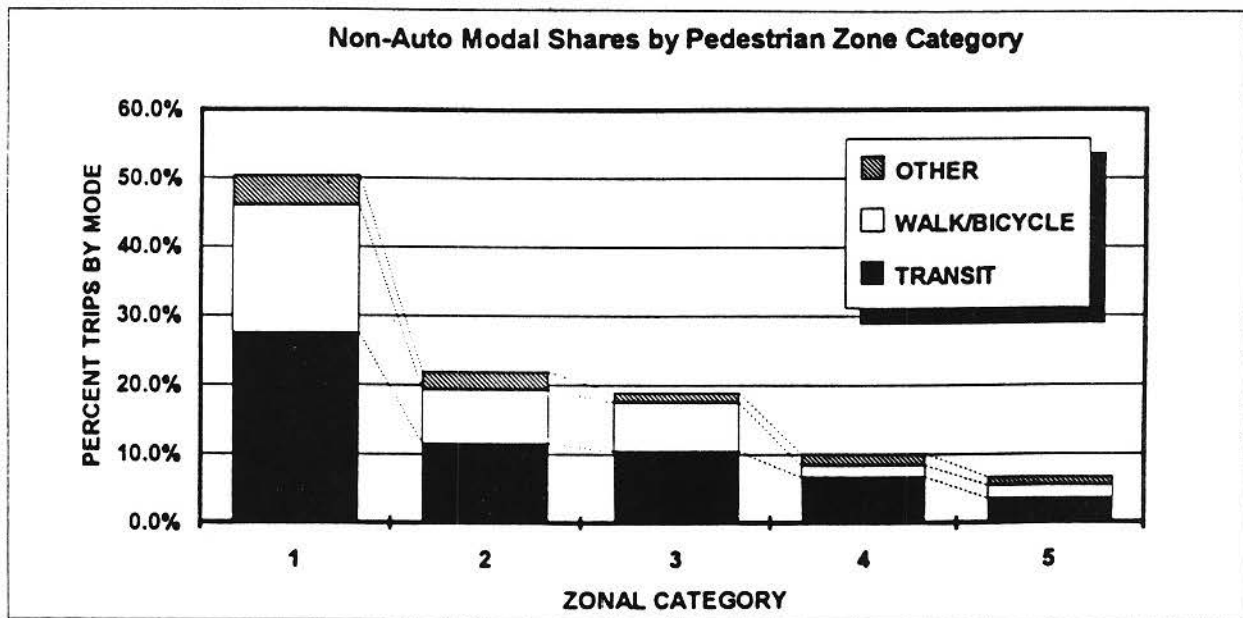


Figure 12: 1000 Friends of Oregon's PEF Study. Source: Parsons Brinckerhoff, et al 1993.

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- daily household vehicle kilometers/miles traveled and vehicle trips drop significantly as the PEF value increases (this correlation is also influenced by socio-economic and geographic factors); and
 - Pedestrian friendly zones isolated within large auto-oriented suburban development cannot support the level of pedestrian, bicycle, and transit activity that comparable neighborhoods can support when located adjacent to neighborhoods with similar characteristics. Clusters of pedestrian-oriented neighborhoods located near employment centers are far more effective in modifying travel behavior.

Cervero (1993) found that residents living near rail stations were five times as likely to commute by rail as the average resident in the same city. Residents and workers commuted by rail more often when their home or destination was near a transit stop and drove more often when they could park free at their destination. The principle conclusion of Cervero's work is that planning efforts need to cluster housing and employment around rail stations before achieving a significant reduction in auto use. Leading from this work are two studies prepared by Bernick which look at the design qualities of planned transit-based communities (1993a and 1993b). He found that the transit station design itself, often surrounded by large expanses of surface parking areas, is probably a factor in discouraging pedestrian access and transit ridership from adjacent high density housing. Similarly, street patterns should be modified to provide both auto and pedestrian connections between development areas and transit stations. In his survey of transit-based housing throughout the U.S., Bernick found that there is no single density or design pattern common to transit-based development. Residential densities range from three to four stories on the west coast to more than 20 stories on the east coast. Finally, Bernick's survey

indicated that while a majority of transit-based housing projects are comprised of market-rate units, their financial success is often dependent on the active participation of local governments.

According to Cervero (1993), richer insights into the link between community design and commuting can be gained from European countries with advanced economies similar to America's. European experiences show that good land use and transit planning as well as careful attention to site design complement each other extremely well and indeed must co-exist if substantial headway is to be made in luring commuters out of cars and into alternative modes of travel. Further study of European and Asian experiences will provide insight to promoting alternative modes of travel at SACs.

Different countries do demonstrate significant variations in the relationship between land use, public transportation policies, and travel behavior. In European communities auto use is generally between 30 percent and 48 percent of all trips; transit comprises between 11 percent and 26 percent of all trips; and pedestrian/bicycle trips are from 33 percent to 50 percent of the total. In comparison, the U.S. average mode split is 86 percent via auto, 8 percent walking, 3 percent bicycle, and 3 percent by transit. Canada has a similar walk/bicycle mode split to the U.S. but a much higher transit utilization – 15 percent of all trips rather than 3 percent (Pucher 1988). Clearly the cost of gas and extent of transit infrastructure investments affect these distributions, along with land use patterns and healthy pedestrian environments. In Europe today gas costs are three times those in the U.S. and may explain a portion of the difference. But to what degree are our land use configurations inhibiting our ability to set similar public pricing policies?

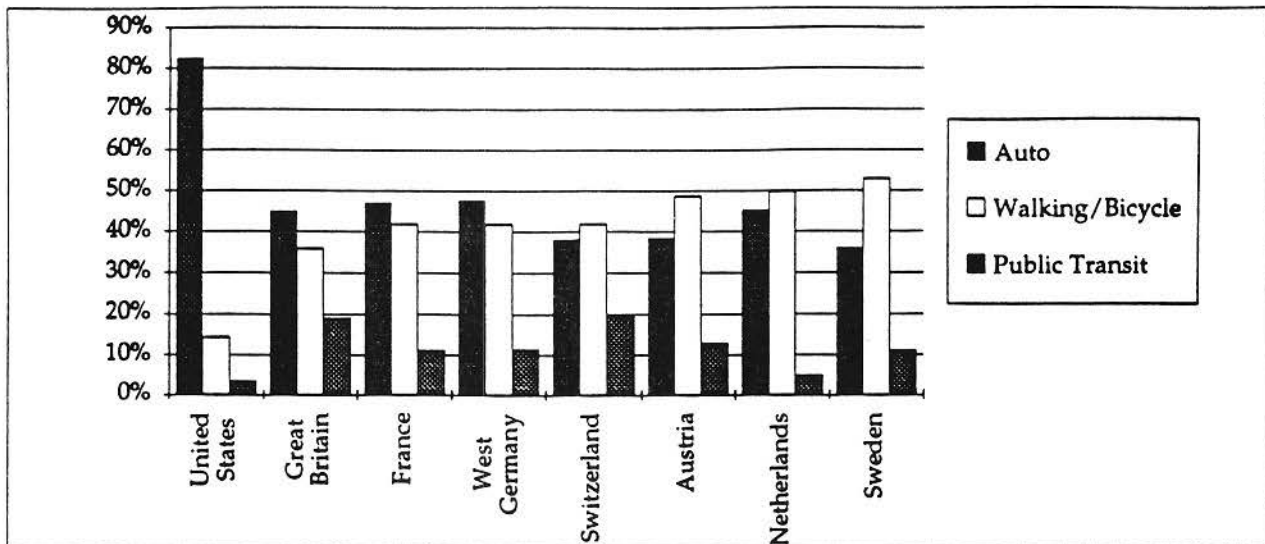


Figure 13: Mode Split as Percent of Total Trips. Source: Pucher 1988

Even without increasing transit or walk trips, the TOD street system can reduce traffic congestion on major streets. Standard suburban and typical SAC development patterns presently force all local and through trips onto the arterial street system. This pattern leads to the congestion which is stifling SACs. In a hypothetical study by Kulash (1990), a suburb with standard street configurations was compared with a mixed-use development with a grid of local street connections. Because of the more direct routing possible in the gridded neighborhood, the overall vehicle kilometers/miles traveled for trips with destinations in the area was reduced by 33 percent and the vehicle kilometers/miles traveled on the arterial network was reduced by 75 percent. Similar findings were made in a study of six communities in Palm Beach County, Florida with different urban form characteristics (Ewing et al 1994). Analysis of household travel data found that on average, 61 percent of household trips are part of a multi-stop trip and even if work trips are long, shopping and recreational facilities internal to the community

produce shorter trips that more than offset the longer work trip. Using this logic, an interconnected system of local streets, internal to the neighborhood, reduces congestion on main roads even if people are using their cars. In TODs, as opposed to most SACs, arterials are seen as edges, providing for through traffic and regional access only. Local streets should be designed to minimize the potential for through traffic while providing access to local destinations.

This was validated in another survey of neo-traditional developers (Lerner-Lam et al 1992) that found that:

- the regular, geometric pattern of interconnected streets typical of neo-traditional development is excellent for pedestrians and bicyclists, and reduces reliance on the automobile;
- developments with basic grid patterns and alleys are well-received by public works departments since they offer less address confusion and greater accessibility; and

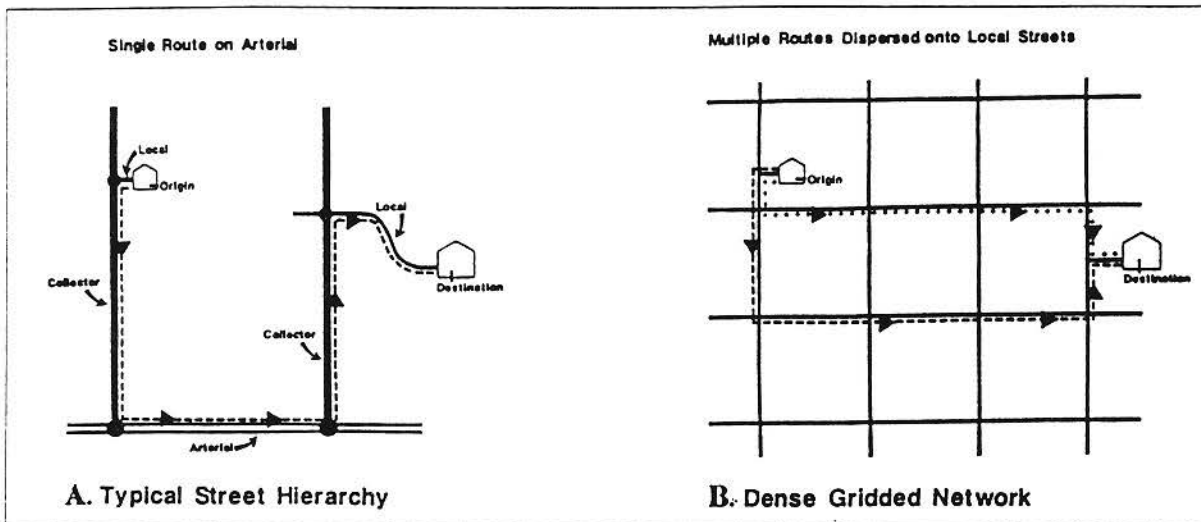


Figure 14: Typical Street Hierarchy vs. Traditional Neighborhood Development. Source: Kulash 1990.

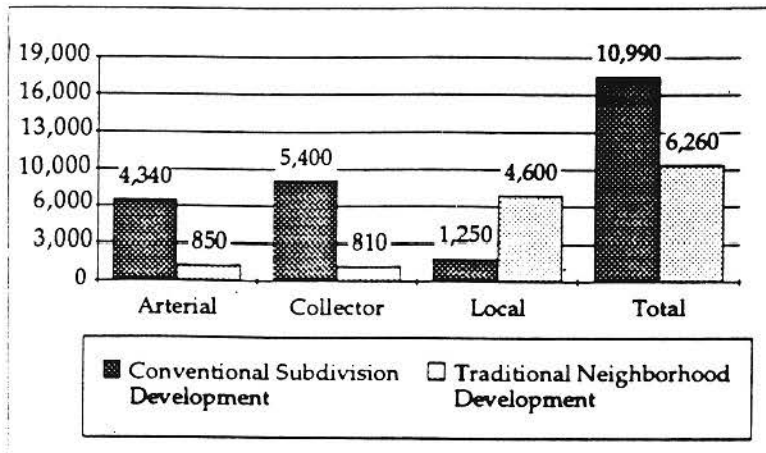


Figure 15: Comparison of Internal VMT. Source: Kulash 1990.

- traditional developments encourage the creation of pedestrians-friendly centers, establishing a sense of place and community, slower street speeds, and mixed land uses.

Finally, at a very focused level, Susan Handy's research into the relationship between street patterns and retail configurations brings together two topics that are rarely related. This paper explores how changes in street patterns and hierarchies have indirectly led to dramatic changes in patterns of accessibility to retail shopping areas, as well as their size, scale, and

orientation. Two parallel histories are traced: the evolution of roadway system conventions from those that promoted the traditional grid to hierarchical patterns that rely on arterials and thoroughfares for a majority of trip purposes; and the changes in retail practices from historic patterns that clustered all retail uses in either a central business district or neighborhood shopping street to dispersed patterns that place ever larger shopping centers in locations that are most easily accessed by car. She concludes that current levels of retail accessibility are not

sustainable. The automobile dependency that is associated with today's retail patterns is also a large contributor to the increasing levels of congestion that are threatening its accessibility.

On the other hand, Cervero (1993) found that transit-friendly design features, like front-door bus staging areas and internal pathways by themselves have little measurable impact on transit ridership. Such features seem to be too minor to exert fundamental influences on travel behavior. Factors such as density and the comparative cost of transit versus automobile travel are the principal determinants of commuting choices. Furthermore, all of the transit-friendly environments he studied had other programs in place, namely TDM initiatives, that made it difficult to attribute aspects of travel behavior to physical design or land uses. And, as mentioned previously, Cervero concludes that macro-elements such as densities and jobs-housing balance exert a greater influence on travel behavior than micro-design elements. Evidence suggests that U.S.

communities that are denser and with more traditional and interconnected street designs average higher levels of walk, bicycle, and transit commuting than nearby comparison communities, controlling for income differences.

Clearly much more research and analysis is needed to clarify and quantify the potential results of a new land use pattern on travel behavior. Understanding this important linkage is fundamental to charting an intelligent set of policies for designing and retrofitting Suburban Activity Centers.

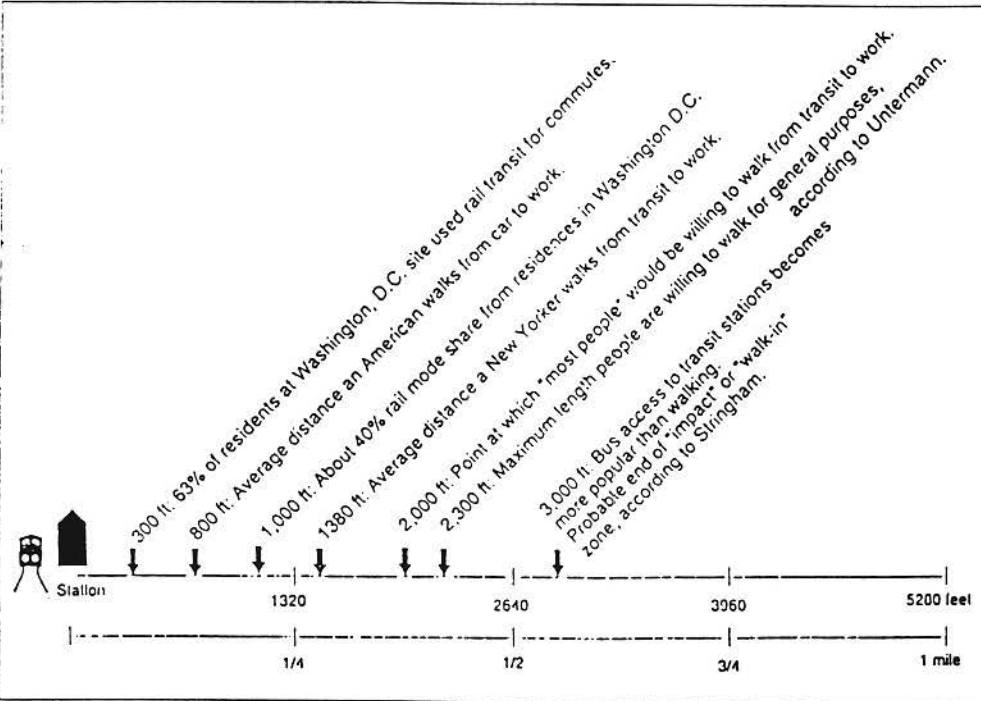


Figure 16: Empirical Evidence on Ridership by Distance. Source: Cervero 1993.

Regional Application of TOD Concepts

Given the significant effects SACs have had on regional mobility, alternative design strategies must be comprehensive in scope and go beyond site and jurisdictional boundaries. This section looks at how TOD concepts have been tested as a model for regional growth.

The LUTRAQ Project, sponsored by 1000 Friends of Oregon (Cambridge Systematics et al 1992) is widely considered a pioneering effort in the study of TODs on a regional scale. It uses Washington County, the fastest growing suburban area within the Portland, Oregon metropolitan area as a case study for developing and analyzing a fully integrated land use and transportation plan. Transit-Oriented Development (TOD) patterns are used to reconfigure the expected 20 year growth in jobs and housing from peripheral locations to sites adjacent to existing and planned transit corridors. LUTRAQ's Transportation Element calls for four light rail corridors that provide high-capacity trunk-line connections to downtown Portland, as well as circumferential transportation between the western and southern suburbs. Bus service improvements include both express bus routes to outlying areas and feeder routes to connect more remote TODs to the light rail system. Bicycle and pedestrian improvements throughout the area would improve safety and convenience for those choosing to walk or ride bicycles. The Demand Management Element consists of a \$3.00 parking charge to all single-occupant vehicles and free transit passes for all employees working within the study area. These features are very similar to those currently in use in the Portland central business district. A subsequent LUTRAQ Alternative also looked at peak hour

pricing charges of \$0.09 per work trip kilometer (\$0.15/mile).

The Portland Metro transportation modeling system (EMME2) was used to conduct simulations of the LUTRAQ plan. Improvements were made to the computer model to make it more sensitive to mixed-use and pedestrian-oriented environments. The results of this analysis indicate that non-auto trips and vehicle kilometers/miles traveled are significantly reduced under the LUTRAQ plan compared with currently adopted land use plans. Thus the LUTRAQ plan would:

- increase the share of trips from home to work made by transit by 45 percent;
- increase the proportion of all trips made either on foot or by bicycle by 22 percent;
- reduce the number of households who will own two to three automobiles by 5.6 percent;
- reduce the number of vehicle trips per household by 7.7 percent; and
- reduce peak hour vehicle kilometers/miles traveled by 13.6 percent.

The analysis also shows that residents living in TODs would enjoy the following advantages in the year 2010:

- over 33 percent would choose to own only one car and over 9 percent would choose not to own a car at all;
- the average TOD household would make 22 percent fewer home-based car trips per day than the average household in the area;
- over 20 percent of the workers living in TODs would choose to take transit to work (over twice as much as under a projection of existing conditions); and
- the children living in TODs would be more than twice as likely to walk or bike to school from their homes, than would children elsewhere in the study area.

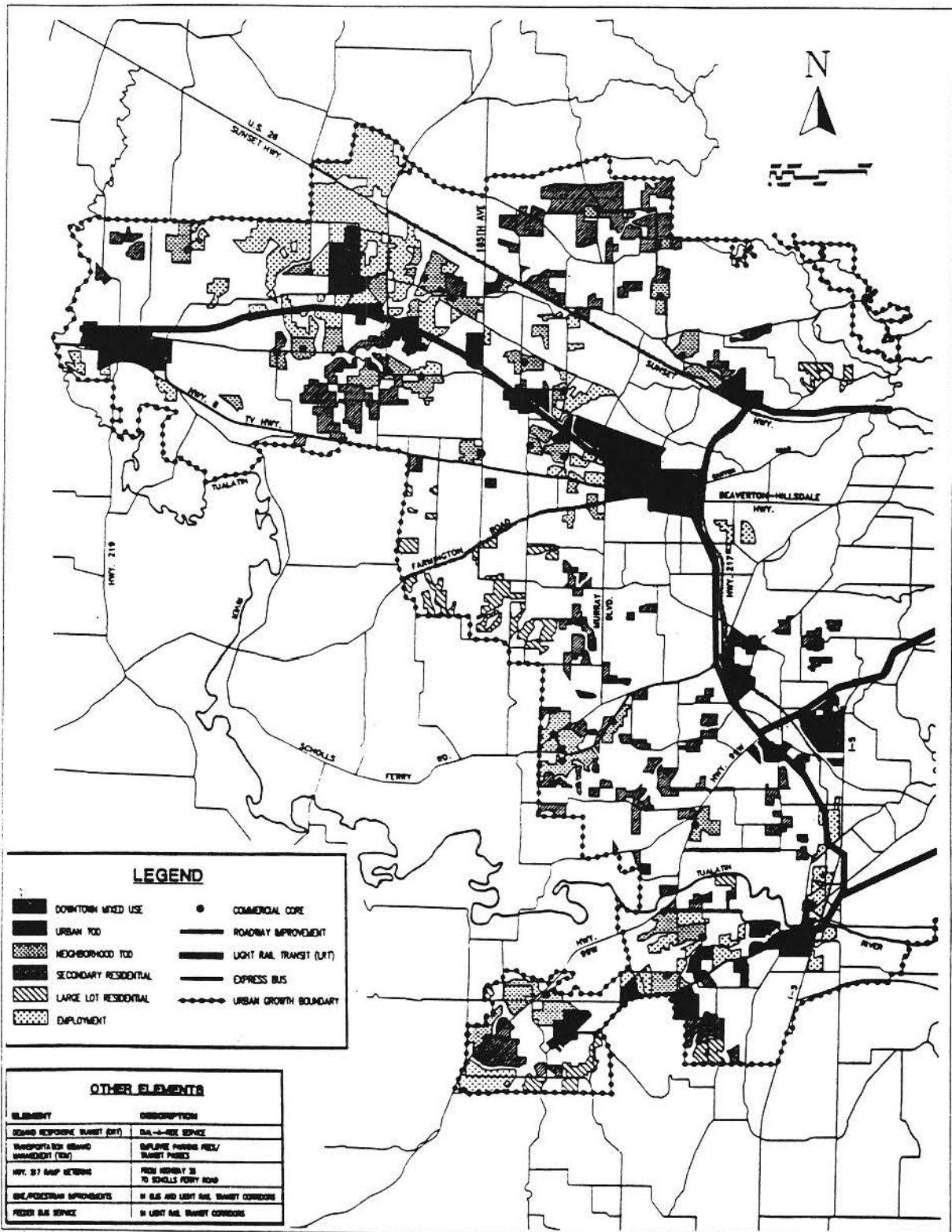


Figure 17: The LUTRAQ Land Use Element. Source: Cambridge Systematics et al 1992.

Similarly, the Middlesex Somerset Mercer Regional Council's study of the "Impact of Various Land Use Strategies on Suburban Mobility" produced interesting results when high density, transit-oriented development patterns were compared with an extrapolation of current low density development trends (Douglas 1992). Using a computer model package, the reduction of auto travel that could be expected from three land use constructs were estimated and compared with travel patterns of "trend" conditions that included the same amount of development in less dense single-use configurations. Testing showed that high density, transit-oriented development would result in 28 percent fewer vehicle trips than trend conditions. If all new growth occurred in higher density, mixed-use development patterns in either the cities or suburbs, there would be 18 percent fewer daily suburban vehicular trips and 12 percent fewer daily kilometers/miles of suburban vehicular travel than would occur with the current regional growth trends. Overall, the study found that:

- mixed-use centers produce significant regional transportation benefits;
- mixed-use centers are a viable concept for suburban settings;
- mixed-use centers can have tangible transportation benefits; and
- promoting strong urban growth along with strong suburban growth provides the best transportation benefit.

The "Region 2040" project in Portland, Oregon provides another alternative model of integrated land use and transportation planning at a regional scale (Calthorpe 1994). Three alternative growth strategies were developed to explore the trade-offs of "growing up or growing out" during the next 50 years. Site-specific design studies were prepared with the

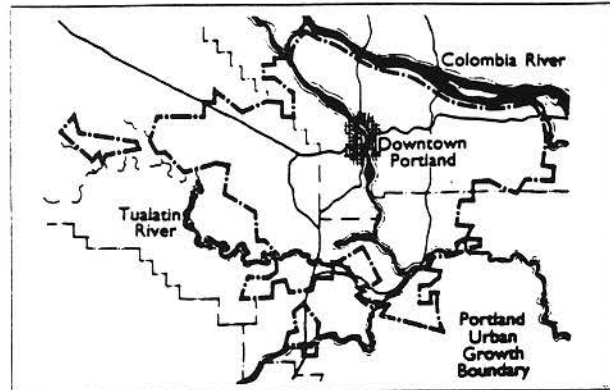


Figure 18: Portland's Urban Growth Boundary.
Source: Calthorpe 1993.

assistance of local "stakeholders" to explore the implications of regional Urban Growth Boundary (UGB) changes on the quality and character of existing urban neighborhoods. A key finding of the study was that the next 50 years of growth can be accommodated within the current UGB and still maintain an urban fabric of primarily three story buildings. This strategy would cluster a majority of new growth along planned transit lines and create a series of interconnected urban centers within the region.

Taken as a whole, these studies show a concerted effort throughout the U.S. to assess the feasibility of using TODs as a regional growth model. Initial results, where available, are quite positive. In fact, groupings of TODs are found to be more successful at making substantial in-roads on auto dominance, than single neighborhoods can ever make (Parsons Brinckerhoff 1993; Cambridge Systematics 1992; Douglas 1992). Thus, strategies that redirect the development of SACs into patterns that more closely resemble those of Transit-Oriented Developments and use those ideas on a regional scale, may be more successful at solving traffic congestion problems and creating more sustainable regions.

Travel Demand Management in Suburban Activity Centers

Travel Demand Management, or TDM, seeks higher levels of efficiency in travel through altering the behavior of travelers toward more efficient modes, fewer or shorter vehicle trips, or travel during periods of lower demand. TDM is not about restricting “mobility,” but in moving *people* rather than motor *vehicles*. TDM and designs for alternative suburban land forms are highly complementary strategies both in goal and result. In a more compact and integrated land use environment, mobility is less synonymous with private vehicle travel – activities are closer and more compatibly arrayed, and with higher densities and a more integrated structure, travel alternatives such as transit, walking, and biking are more realistic and attractive. Such land use patterns would be expected to enhance the potential effectiveness of TDM. At the same time, since TDM encourages more efficient travel, it can be seen as supporting the land use innovations. This portion of the literature review addresses the role played by Travel Demand Management (TDM) programs in influencing travel behavior in a manner which bears upon the effectiveness of Suburban Activity Center designs.

Exactly what TDM encompasses is matter of definition. Many popularly construe TDM as being the program efforts of employers to manage employee travel. However, TDM may be extended to include all strategies that entice solo drivers out of their cars. Incentive, such as transit, high-occupancy vehicle (HOV) lanes, publicly-imposed taxes, tolls and fees, or even the legal/regulatory instruments are all regularly part of TDM programs. Both employer and public efforts are important and essential to creating effective programs.

Prior to a few years ago, it was difficult to say with any precision or confidence what TDM was, what it could accomplish and what caused its success (or failure). Focus fell upon the employer-based efforts or regional ridesharing efforts, which were commonly “soft” promotional efforts, with equally inspecific or inconsequential results. Few good programs and lack of rigorous research and documentation helped sustain the aura of doubt and controversy associated with TDM. Over the past 5 years, however, some important new research has surfaced that brings forth compelling evidence concerning the nature and performance potential of TDM. This research is as important for quantitatively documenting “what works” as for making it clear “what doesn’t work” and why.

There are a series of national studies that have focused on measuring and explaining the performance of TDM. A study by KT Analytics (1989) for the Federal Transit Administration looked at over 40 employer and area-wide TDM programs in SACs around the country and attempted an initial assessment of their effectiveness in changing behavior. They study used change in single-occupancy vehicle (SOV) shares as the primary measure of effectiveness. The motives of the implementor and the specific measures used were also evaluated. Using this analysis, initial estimates of the costs of TDM programs were developed. A subsequent study by COMSIS (1990) for the Federal Highway Administration (FHWA) on “Effectiveness of TDM Measures in Alleviating Congestion” went a little further than the KT Analytics study in actually measuring vehicle trip reduction of a somewhat smaller and more locationally

diverse (not just suburban) sample of sites. This study began to make it quite clear that properly configured TDM programs could have substantial impacts; net trip reductions of 20 percent to over 40 percent were measured reliably for a number of the sites, and analysis showed that their effects were well explained by the recurrence of some important measures – parking management and financial incentives and disincentives in addition to more conventional transit and rideshare promotional activity. Neither of these studies specifically controlled for the linkage of these programs with surrounding land use, although the study samples were knowingly selected to be locationally diverse and some of the effects can be inferred to be related location.

TDM research delving into employer-sponsored programs has become more prolific and probing in the post-1990 era of the Intermodal Surface Transportation Efficiency Act (ISTEA) and the federal Clean Air Act. More concern has emerged with regard to the effectiveness of these programs in meeting transportation and air quality goals, and in their cost effectiveness to employers. An extension of the COMSIS 1990 FHWA research into a larger 1991-1993 effort: "Implementing Effective TDM Actions" greatly expanded the base of TDM case studies, gave more substantial basis to claims of important strategies, and offered initial estimates of the costs and cost effectiveness of TDM programs to employers, society and individuals. These analyses showed (1) further evidence that properly structured programs could have major impact on travel, and (2) that trip reduction through TDM was far more cost effective than supplying new highway capacity. A study by JHK & Associates (1992) on "Cost Effectiveness of TSM Measures in

Suburban Activity Centers" for the City of Pleasanton, California pursued similar objectives. It drew relationships from extensive local and national data on the travel and cost effectiveness of employer-sponsored TDM measures, with segmentation by different types of land use settings. Both the JHK study and the COMSIS study developed computer models which can be used to evaluate different TDM strategies in different settings; the COMSIS model is generally regarded as more realistic/accurate in the forecasting of travel impacts, the JHK model offers its strength in estimating the cost impacts of particular strategies. COMSIS and an expanded research team are currently involved in research for the Transportation Research Board's TCRP program on "Cost Effectiveness of TDM Programs" which has gone into even more detail on the impacts of TDM programs, contributing measures, and costs/cost-effectiveness. A June 1994 working paper sets forth important new findings on this important subject, validating and deepening evidence on earlier theories regarding important TDM measures and setting parameters. Initial results indicate that programs located in Suburban Activity Centers, with expected access to better transit service, walk access to services/activities, and generally restricted (occasionally priced) parking, demonstrate much greater success than those programs situated in suburban strip developments, in business parks, or in isolated locations. These findings may be of strategic relevance to the present study.

It is fairly safe to say that the definitive study linking TDM and land use has not yet been done. The land use studies which have TDM elements (LUTRAQ, MSM, MAG Congestion Management Study) have tended to treat TDM

peripherally, while the TDM research has been attentive to the land use/setting factor, but not been particularly rigorous in incorporating land use as a determining factor. Nevertheless, the research findings and modeling tools described above hold a wealth of information to infer the fit of TDM in an efficient SAC design. The ability to project what TDM measures or programs can do with respect to travel behavior is much more advanced and flexible than it was only a few years ago, and these studies and modeling tools can help supply that link.

Conclusions

The literature prepared to date regarding SACs indicates that the current design of SACs does not encourage multi-modal travel by employees and residents. Rather, SACs have been sited and designed on an ad hoc basis, with the interest of low land costs and easy auto accessibility as primarily determinates. Tackling the problems that have emerged from SACs – excessive congestion, longer commutes, lack of affordable housing, declining air quality, and regional sprawl – will need to take place on a number of levels to ensure long-lasting remedies.

At a site-specific level, SACs need strategies that address the extent of intermediate trips by employees, lack of density and activity, low parking costs, lack of housing that is affordable to SAC workers, and poor pedestrian amenities and transit service. Clearly these strategies will vary depending on the site's location within a region and whether the site is currently developed or is still in the planning stages. On a regional level, SACs must contribute to, rather than detract from, the overall health and sustainability of a region. TOD patterns, as well as some recommended retrofit strategies, may prove to be useful models in this regard. The focus of this study will be to develop and test such strategies within the context of an interdisciplinary approach that integrates land use, urban design, circulation planning, and travel demand management.

Chapter 4: Features of an Efficient Suburban Activity Center

The research presented in the previous chapters demonstrates a common set of problems within Suburban Activity Centers:

- high single-occupancy vehicle commuting by SAC workers and residents;
- frequent trips during the day by auto;
- poor pedestrian amenities and transit service;
- lack of housing that is nearby or affordable to SAC workers;
- widely available, low cost parking; and
- expanding, low density regional growth patterns.

Since SACs can have an enormous impact on the form, function, and livability of regions, new approaches to their design and management should be considered.

What is an Efficient Suburban Activity Center?

Defining an "efficient suburban activity center" is not as simple as it sounds. While quantitative measures of travel behavior, such as mode split and trip generation, provide indicators of performance, they do not fully describe the complexities of "place making." If it can be stated in simple terms, an efficient Activity Center would be one where employees would be comfortable using transit, walking, or bicycling to work because the work environment allowed them to take care of daily needs without a car. This implies that workplaces

ELEMENTS THAT MAKE ACTIVITY CENTERS EFFICIENT

Mixed-Use

A mix of land uses within walking distance provides employees the option of taking care of daily errands on site.

Density and Activity

Concentrating retail, services, offices, and residences in selected locations helps create activity on the street.

Interconnected Street System

An interconnected street system keeps local trips on the site and reduces demand on through streets. Shorter trip distances reduce vehicle travel and make walking more convenient.

Pedestrian and Bicycle Orientation

Design of new streets and buildings should consider how pedestrians and bicyclists experience the place. Too often, a development plan only considers auto access.

Frequent and Reliable Transit

In order for transit to become a viable commuting option for suburban workers, it must link to key destinations, run on a timetable that is convenient, and be reliable.

Parking Design and Management

At a minimum, parking configuration should consider pedestrian access. Parking minimization, pricing, and management should also be considered.

Travel Demand Management Program

The most efficient Activity Centers also have an effective Travel Demand Management Program. Public and private efforts should be coordinated.

Effective Implementation Program

An Activity Center should not be static; ongoing efforts should be made to integrate new ideas and coordinate development activities.

need to provide a range of services and amenities close by so that daily errands can be performed on foot; so that a quick lunch is convenient nearby; so that a child can be visited in an on-site day care center; and that the physical environment makes walking enjoyable. Making alternative commuting practices enticing also means ensuring that commuting options are convenient and safe - efficient transit service, timed transfers, carpool rider matching services, and guaranteed rides home - are all important considerations for today's busy working families.

Thus, defining an efficient Activity Center requires monitoring quantitative measures and balancing a variety of qualitative factors. A

study of six exemplary Suburban Activity Centers (see Chapter 7) showed that employee drive alone mode shares to centers were typically 8% to 13% lower than for the region as a whole, despite the fact that single-occupancy vehicle travel was increasing in each region. Site-specific drive alone mode shares ranged between 58% and 77% for employees and as low as 35% for residents. In addition, land use patterns, intensity of development, street systems, urban design, pedestrian and bicycle amenities, transit services, parking, and on-going management were all considered important components of making Activity Centers both efficient and healthy places.

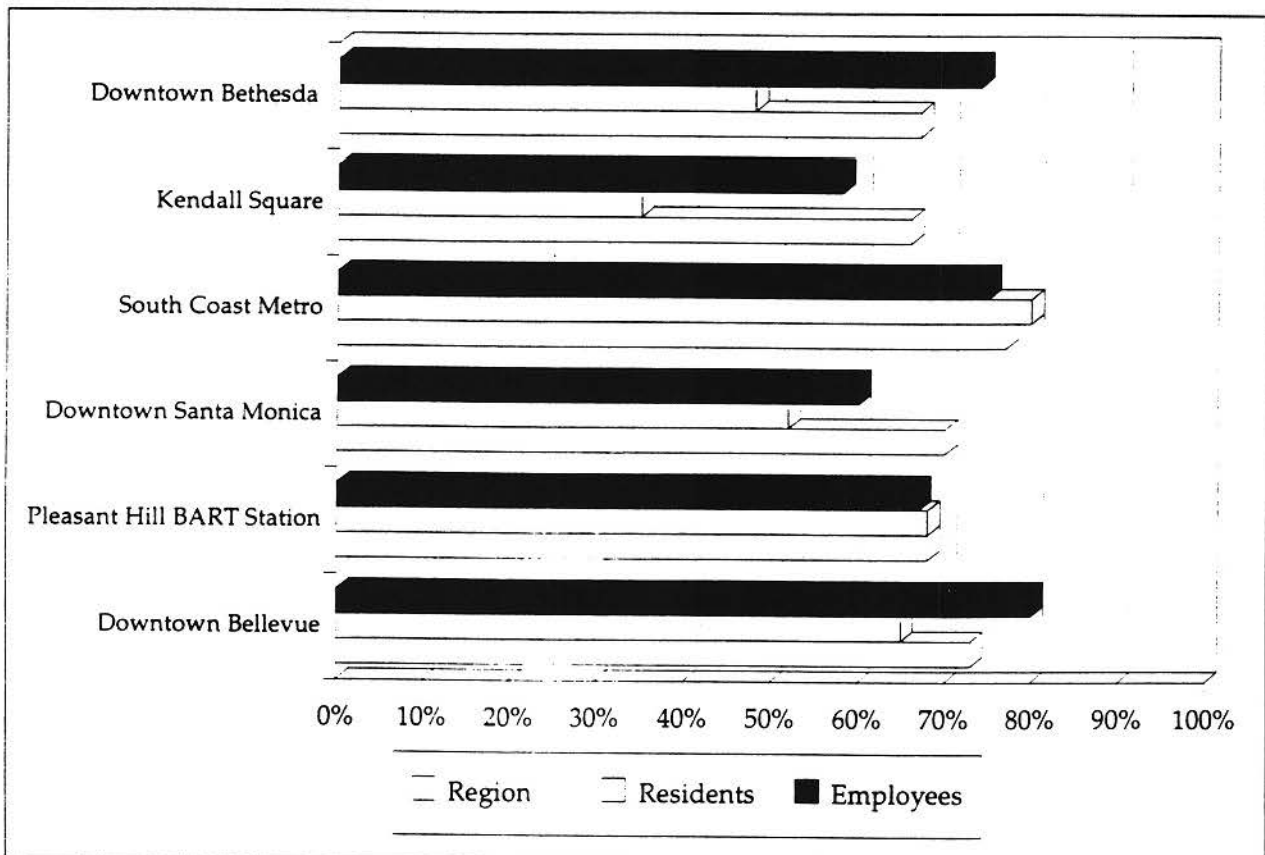
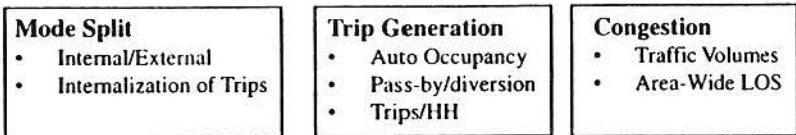


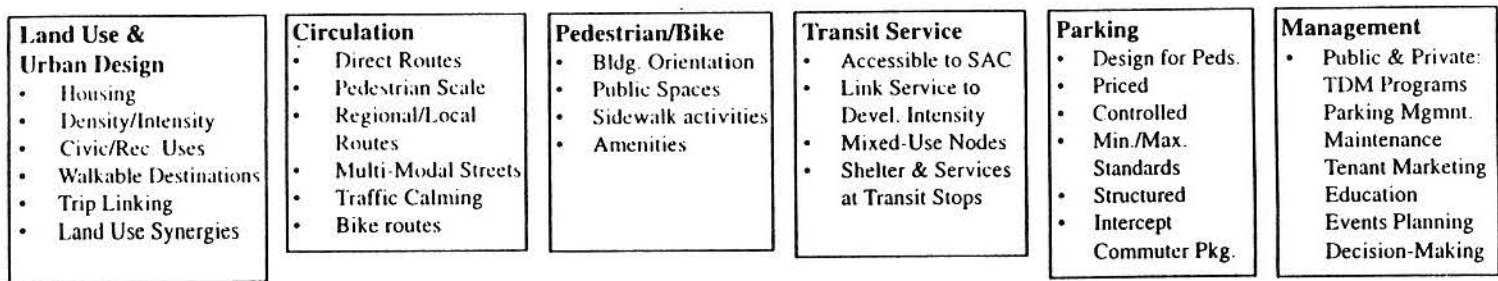
Figure 19: A survey of Drive Alone Mode Shares in six exemplary Activity Centers (See Chapter 7), indicates a wide diversity of results. Optimal mode shares are at least 10% better than the overall region.

What is an Efficient Suburban Activity Center?

Measures of Efficiency



Elements that Affect Efficiency



Implementation Strategies

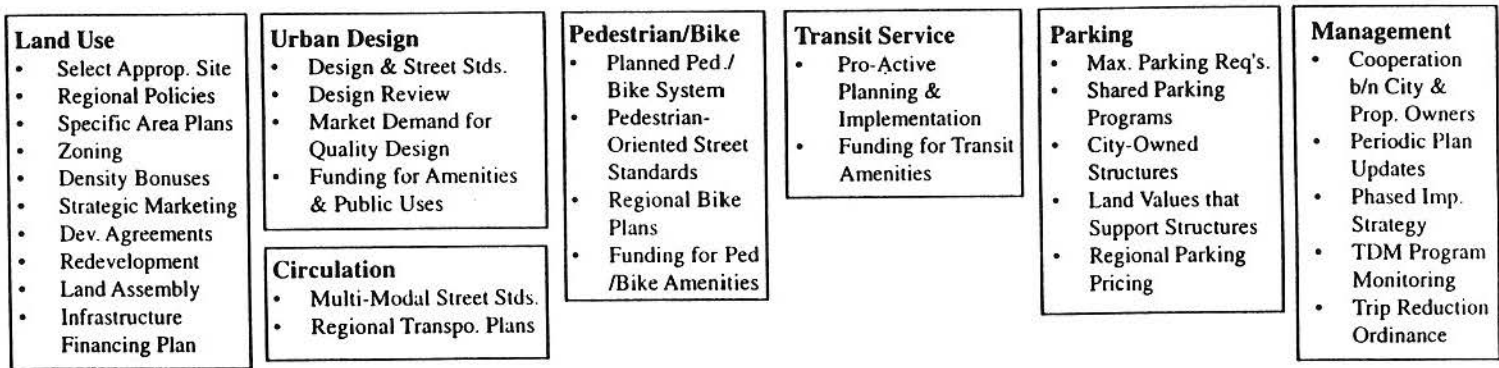
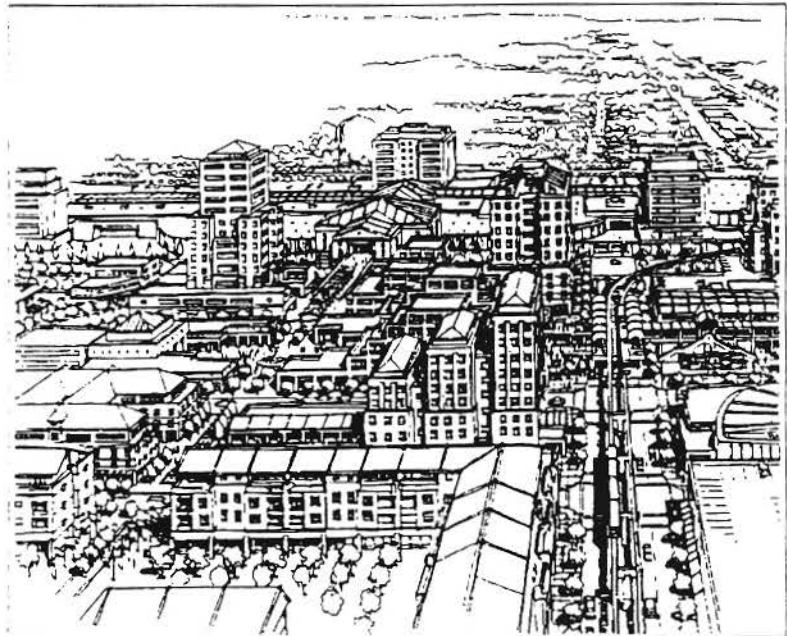


Figure 20 illustrates the core of a hypothetical Activity Center. This mid-sized development (30 to 80 hectares or 75 to 200 acres) includes a mix of office, retail, entertainment uses, housing, and civic facilities within a fine-grain fabric of interconnected streets. Lower density office, warehouse, and residential uses surrounding this most concentrated area. Its daily population is between 10,000 and 25,000 employees and residents. Larger centers will have several nodes like this one and will often accommodate a daily population of over 35,000 employees and residents.

Buildings line streets and public spaces to create a pedestrian-friendly environment. Transit stops at the center of the site, placing a variety of uses within walking distance. Nearby housing and entertainment uses create the potential for 24-hour activity, and help make the Activity Center both economically diverse and safe during evening hours. Finally, parking is placed behind buildings in structures

and is strategically located so that spaces planned for day-time office use can double as evening parking for an on-site cinema. Such a place has the potential to create a positive addition to a city, while respecting the practical realities of how development takes place in suburban locations throughout the country. These strategies can be combined at various sites and scales: larger Activity Centers will be comprised of several nodes, much like this one; smaller centers may not have this diversity of land use.

There is no "silver bullet" for making an Activity Center efficient. Solutions must be tailored to local conditions, both site-specific and regional. In fact, the communities that have made the most headway in terms of reducing automobile reliance have taken great pains to develop plans, programs, and strategies that address unique local conditions and grow out of a locally-based decision-making process.



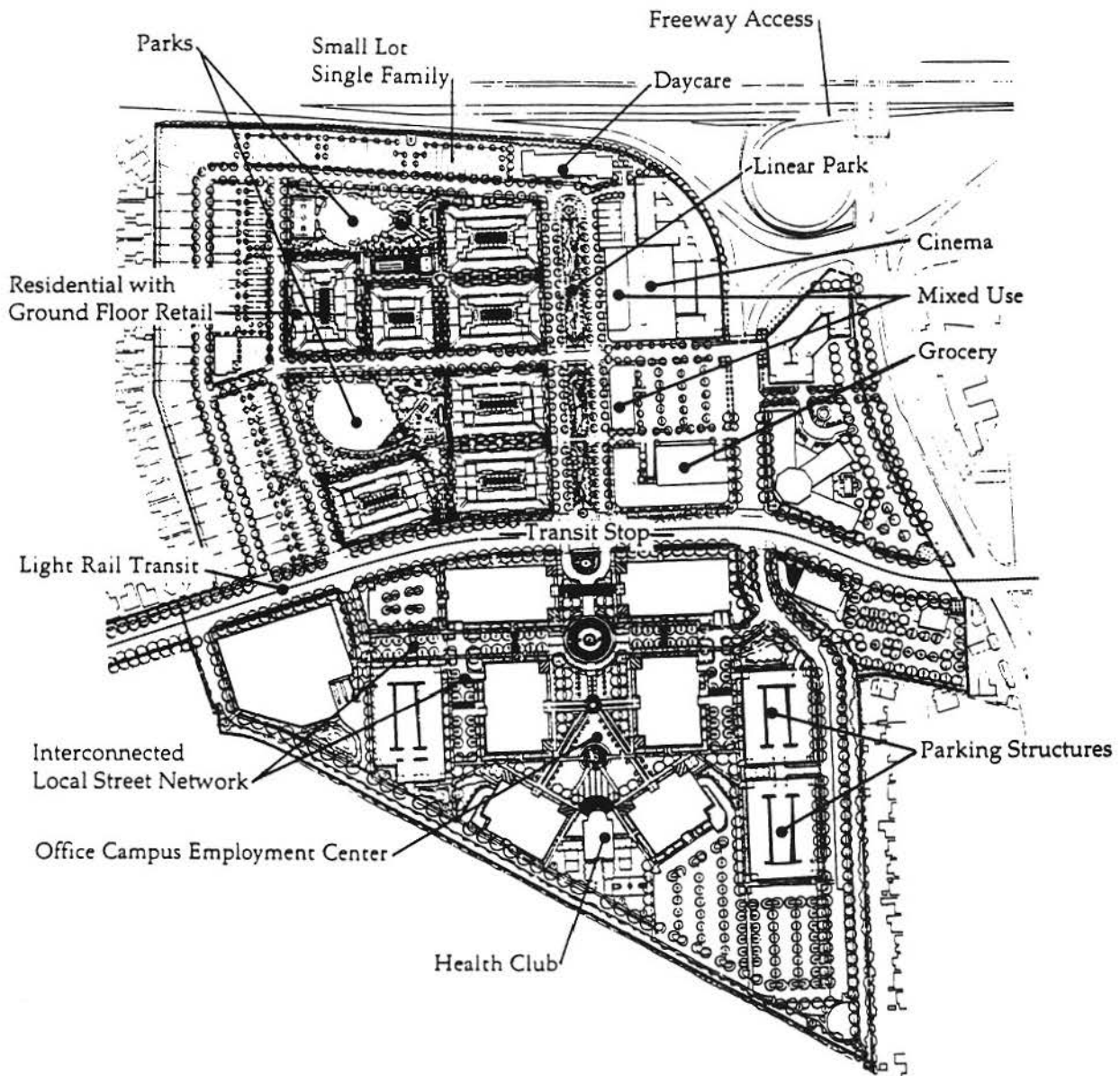


Figure 20: Efficient Activity Centers will be sites with a combination of office, retail, and housing, a series of mixed-use nodes that provide services for employees and residents, public spaces, and convenient transit.

Chapter 5: Redefining SACs – Design Principles for Efficient Suburban Activity Centers

This section focuses on physical design components of efficient Suburban Activity Centers. It presents a series of Design Principles that are intended to provide guidance in designing new Activity Centers or retrofitting existing centers. These principles identify the most important features of an efficient Suburban Activity Center. Since every site is different, they should be used as basic guidelines that are tailored to local conditions, rather than hard and fast rules.

Five basic design elements are identified that should guide the development of new SACs and assist in retrofitting existing SACs: Transit-Oriented Mixed-Use Nodes; Interconnected and Multi-Modal Street Systems; Pedestrian Design and Orientation; Frequent and Reliable Transit; and Appropriate Parking Configuration and Minimization. Though many other principles of good design can and should be employed, these elements represent the components most likely to help make SACs that are walkable, bikable, and transit-friendly places.

DESIGN PRINCIPLES FOR EFFICIENT ACTIVITY CENTERS

Transit-Oriented Mixed-Use Nodes

- Create Walkable Destinations in Centers
- Maximize Trip Linking Opportunities
- Seek Land Use Synergies
- Provide Housing within Activity Centers
- Cluster Density and Intensity
- Integrate Civic and Recreation Uses

Interconnected and Multi-Modal Street System

- Provide Direct Routes to Local Destinations
- Create a Pedestrian Scale Block Pattern
- Plan for Local and Regional Travel Routes
- Use Multi-Modal Street Design
- Encourage Traffic Calming
- Link Bicycle Routes into Activity Centers

Pedestrian Design and Orientation

- Orient Buildings to Streets
- Encourage Public Spaces & Sidewalk Activities
- Provide Pedestrian and Bicycle Amenities

Frequent and Reliable Transit

- Locate Major Transit Stops in Centers
- Link Service to Development Intensity
- Locate Major Stops in Mixed-Use Nodes
- Provide Shelter and Services at Transit Stops

Appropriate Parking Configuration and Minimization

- Configure Parking to Balance the Needs of Pedestrians and Cars
- Encourage Shared & On-Street Parking
- Establish Min. & Max. Parking Standards
- Redevelop Surface Lots with Structures
- Require Priced Parking
- Provide Intercept Commuter Parking

Where Can the Design Principles Be Applied?

The Design Principles for Efficient Suburban Activity Centers can be applied in many different types of locations: urban or suburban, small or large. Three general categories of appropriate sites are:

New Growth Sites: The most straightforward application of the Design Principles will occur on large tracts of raw, undeveloped land over 80 hectares (200 acres) and often between 200 and 400 hectares (500 to 1,000 acres). Typically located at a region's periphery, new growth sites face the dilemma of either promoting urban sprawl or filling a strategic urban development need. Analysis of regional growth patterns, open space resources, and transportation networks should precede site selection. Careful steps should be taken to ensure that sufficient transit service can be provided, that the mix of on-site land uses provides both live-work and convenience shopping options, and that the on-site street network encourages walking, bicycling, and trip linking.

Infill Sites: Many regions have mid-sized sites (30 to 80 hectares or 75 to 200 acres) that have been passed over or are ripe for re-use. These sites present opportunities to repair the urban fabric and intensify along existing transit corridors, instead of continuing to expand at a region's edge. Since most infill sites have relatively high land values, a critical mass of office, retail, and residential uses can often be achieved, making a substantial influence on sub-regional travel patterns. Site planning for infill locations should maximize the mix and intensity of land uses, tie into existing or planned transit stations or stops, connect a new street network with existing street systems, and take steps to minimize or manage on-site parking.

Retrofit Sites: Though the most challenging of the three types of sites, retrofit conditions have two distinct advantages: existing available infrastructure and an established on-site employment base. Most existing Suburban Activity Centers fall into this category. Efforts on these sites should focus on improving street and pedestrian networks, broadening the overall mix of activities and land uses, creating mixed-use nodes that are within walking distance of on-site employees, redeveloping strategic sites with structured parking, adding street furniture and public spaces; and incorporating transit service where none currently exists.

Design Principle #1: Transit-Oriented Mixed-Use Nodes

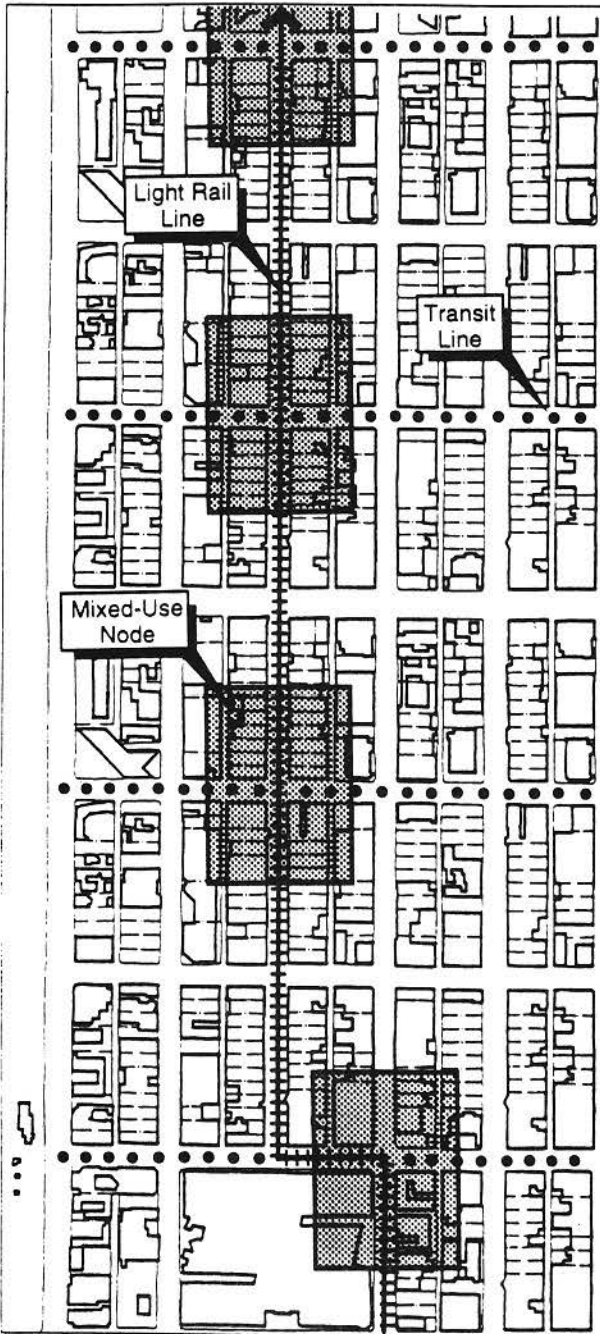


Figure 21: Mixed-Use Nodes in Activity Centers provide destinations with services that are within walking distance of most employees.

As regions grow, Activity Centers are increasingly part of our urban fabric, serving as centers for employment, commerce, and living. To maximize the return on public investments and set a standard for the quality of metropolitan living, significant public investments in transit, services, and infrastructure should firmly establish these sites as major regional destinations. Segregated development patterns work against this goal. Many Activity Centers have been built as single-use developments with few, if any, employee services and little or no transit. This means that employees have no choice but to commute by car because they must drive for the simplest errand. Other Activity Centers do contain several uses, but these uses have been built as "stand alone" projects with few, if any, street or pedestrian connections. These developments lose the benefits of mixed-use because their disconnected street pattern discourages walking and creates a built-in incentive to drive. In both cases, the need to drive for everyday errands fundamentally works against the desire to make places that can support healthy transit and pedestrian-oriented places.

Current conditions present a pressing rationale for reversing recent development trends and reconstitute Activity Centers as places with a healthy mix of uses. The design elements can be found in many of our oldest traditions: Elm Street, Main Street, the village green, multi-use buildings, and mixed-income housing. These building blocks helped establish individual identity to communities, yet maintained the functionality of places. Elm Street provided a comfortable walking route to Main Street,

where a variety of goods and services were clustered. The village green provided both a public place for civic events and a prestigious address for adjacent businesses. Multi-use buildings often placed offices or housing above ground floor retail, thus introducing a level of density that supported transit. Each of these features helped build communities where walking and transit were viable alternatives to the automobile.

Creating "walkable destinations" within each Activity Center builds upon the lessons of traditional town planning and reinterprets them to fit with today's market realities and lifestyles. Each major employment center should be structured around one or more Mixed-Use Nodes that serve as pedestrian, bicycle, and transit destinations. The design of streets and the mix of uses in these nodes should support this goal to the greatest extent possible. Mutually reinforcing uses that serve the needs of employees and residents should be clustered into these "pedestrian-friendly" places. At a minimum, some convenience-oriented retail, a park or plaza, and civic facilities, such as day care, a recreation center, or post office, should form the core of these nodes. Housing will also play a key role in extending activity into evening hours and providing an option for those who wish to live and work in the same community.

The benefits of such a framework are numerous. Employees will have an incentive to use transit because it is easy – transit stops will be within walking distance of their place of employment; nearby shops and services allow employees to take care of errands on foot; and because civic and commercial uses are clustered, several errands can be combined in one trip. This pattern not only reduces the number and length

Transit-Oriented Mixed-Use Design Principles

- *Create Walkable Destinations in Activity Centers*
- *Maximize Trip Linking Opportunities*
- *Seek Land Use Synergies*
- *Provide Housing within Activity Centers*
- *Cluster Density and Intensity*
- *Integrate Civic and Recreation Uses*

of auto trips, but saves time – an invaluable commodity for today's worker and especially double income families. Not all Mixed-Use Nodes need to have an identical mix of uses. Market practicalities will inevitably lead to a variety of different types of places. In some cases, a Mixed-Use Node may be anchored by a regional shopping center; other nodes may focus more on the needs of nearby business clients, with a mix of business services and restaurants; an area with a large component of housing may be able to support a grocery store-anchored node, and the smallest node may center on a convenience store and deli. In this way, walkability will be imbedded into the physical framework of Activity Centers.

Transit-Oriented Mixed-Use Design Principles

Create Walkable Destinations in Activity Centers

All Activity Centers should have one or more Mixed-Use Nodes that are focal points for density, activity, and transit. These nodes should be centrally located, scaled to the pedestrian, and accessible via walkable streets or paths.

Nodes should contain, at a minimum, some convenience-oriented retail, a park or plaza, and civic facilities, such as day care, a recreation center, post office, etc. They should create identity for individual districts within an Activity Center and be a place where employees or residents can take care of daily errands. The types of commercial uses that are provided on-site should meet the needs of on-site employees and residents. Infill and redevelopment should emphasize filling gaps in the urban fabric, both in terms of physical sites that may be opportunities for new development, but also in terms of uses that complement or meet a need in the diversity of activities.

Dispersal of mixed-use destinations should consider the density of employment and residential uses within walking and bicycling distance. Thus, most employees should be able to take a short 10 minute walk to grab a sandwich at lunch time or pick up a child at daycare after work. The size of mixed use nodes should be scaled to the pedestrian, generally a 400 to 800 meter (1/4-1/2 mile) radius from the transit station.

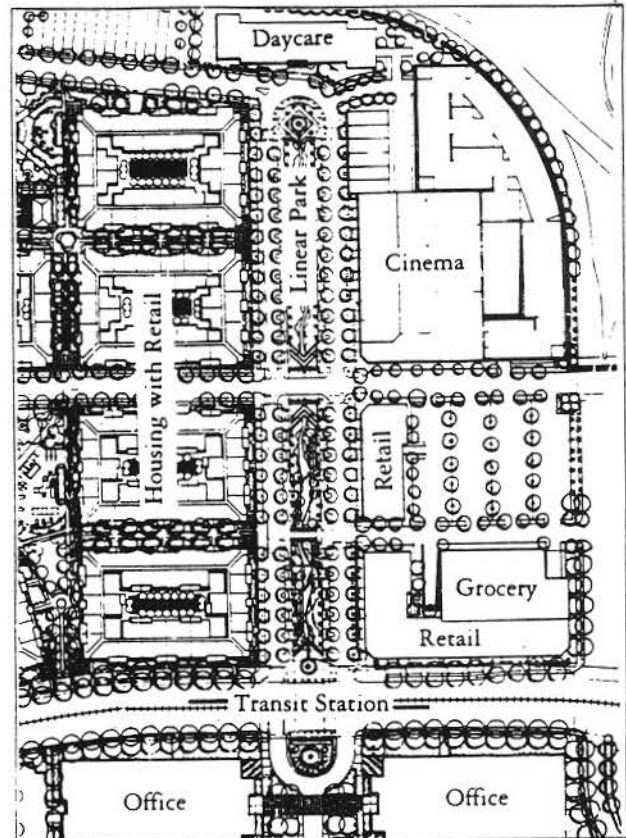


Figure 23: Mixed-Use Nodes within an Activity Center should form the armature of an on-site transit system.

On-Site Services Meet Everyday Needs

A study of Activity Centers throughout the United States found that as many as 79% of Activity Center office employees make "intermediate trips" either to or from work or at midday. Placing services on-site allows employees to commute via transit or carpool because they have the option of going to the bank or visiting a child at daycare at lunch time without needing a car. Hooper, 1989.

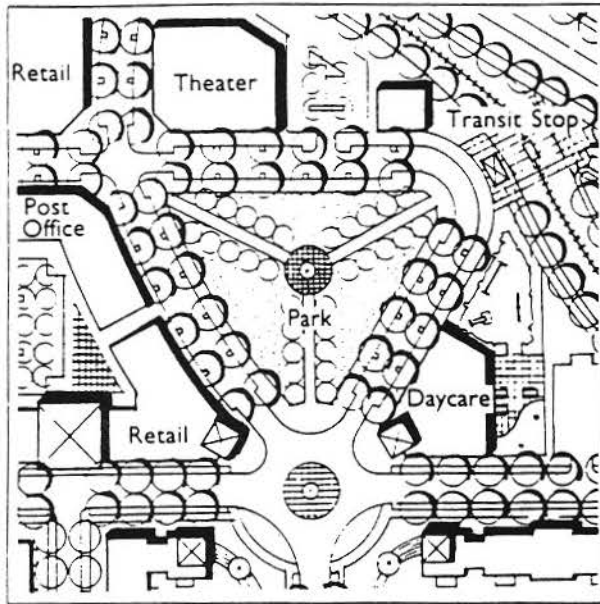


Figure 24: Clustering services adjacent to the transit stop allows transit and retail patrons to “trip link” – or shop at several businesses in one central location.



Figure 25: Complementary uses, such as movie theaters, can extend the active hours of an Activity Center into the evening. Parking for daytime office uses can double as evening theater parking.

Maximize Trip Linking Opportunities

Create bundles of mutually reinforcing uses in Mixed-Use Nodes, such as day care, convenience retail (dry cleaners, grocery, drug, ATM, video), recreation (gyms, health clubs, pools), and civic uses. Place nodes in central locations that are adjacent to transit stops. This allows a commuter to take care of a variety of daily needs on the way to and from work on transit without needing a car. Even if a car is used, several businesses can be visited with one stop and one parking space.

Existing Activity Centers can often be retrofit to allow ground floor retail in key locations. Building renovation and leasing strategies should identify key locations within proximity of transit stops for employee-serving uses. Or, in some cases, surface parking lots can be redeveloped over time to infill Activity Center and create new Mixed-Use Nodes.

Seek Office, Shopping, and Entertainment Synergies

Mixed-use patterns can do more than provide an office worker a nearby place to grab a sandwich. Mixed-use also makes good economic sense. Patrons of one use have the opportunity to frequent another and a single development can target a variety of markets that may be “hot” at different times. Depending on the size of an Activity Center and its location within the region, consider planning for a mix of office, shopping, entertainment, and residential uses. This mix helps create both day and night time activity, as well as bolster the economic stability of the district. Office workers may, for instance, stay after work for shopping or a movie. Visitors from other parts of a community may also use the Activity Center as an evening entertainment district.



Figure 26: A healthy mix of ownership and rental housing should be considered in Activity Centers. Housing prices should be matched to local wages.

Provide Housing within Activity Centers

Housing is a key component to healthy and safe Activity Centers. Residents will frequent local businesses and extend hours of activity beyond five o'clock. Locating housing within an Activity Center also gives some employees the choice to live within walking or bicycling distance of work, provided the cost of housing matches the income levels of on-site jobs. Areas that are developed with housing should be planned as neighborhoods and include the civic amenities necessary to make high density urban living enjoyable. A mix of housing densities, ownership patterns, prices, and buildings types is also desirable to make healthy, vital, and active urban neighborhoods within Activity Centers. Such richness helps to create and stabilize culturally diverse communities and support a wide range of economic opportunities.

Cluster Density and Intensity

The highest commercial intensities and residential densities within an Activity Center should be located in mixed-use, transit-oriented locations. With an appropriate mix of land uses, pedestrian-oriented and transit-supportive design can accommodate higher residential densities and commercial intensities because fewer trips are made by car. (With two-thirds of many suburban projects devoted to parking alone, the savings in land or potential for additional development is significant.) Conversely, higher densities and intensities strengthen the viability of transit and local retail amenities by placing more residents and employees within a reasonable walk.

Walkable Nodes in Tysons Corner!

Tysons Corner, Virginia is the largest concentration of retail and office space on the east coast outside of New York City and is looking to update its plan and image. Built originally as a series of "office campuses," Tysons is encountering traffic congestion and has few walkable districts. A plan to retrofit Tysons involves:

- *creating mixed-use walkable districts;*
- *465,000 square meters of new office space;*
- *housing for 4,000 to 5,000 residents;*
- *185,000 square meters of new retail space;*
- *linkages to regional and internal transit ;*
- *greatly reduced amounts of parking;*
- *an expanded pedestrian system; and*
- *streetscape and signage improvements.*



Figure 27: Mizner Park, in Boca Raton, Florida is a regional shopping center that focuses on a lushly planted panhandle park. Visitors to the center's restaurants, shops, offices, and residences use the park as a promenade – a place to see and be seen.

Integrate Civic and Recreation Uses

Parks, plazas, and civic uses should provide a public focus for each district within an Activity Center and be within a short walk of all offices and residences. They should be located next to public streets, as the focus of retail and employment nodes, close to transit, and within residential areas. Parks should not be formed from residual areas, used as buffers to surrounding developments, or used to separate buildings from streets. Instead, they should be designed as important places for public events and casual interactions. Civic services, such as community buildings, government offices, recreation centers, post offices, and libraries should be placed in central locations as highly visible focal points. Sites for pre-school daycare should also be provided in all districts within walking distance of transit or within core commercial areas.

Design Principle #2: Interconnected and Multi-Modal Street System

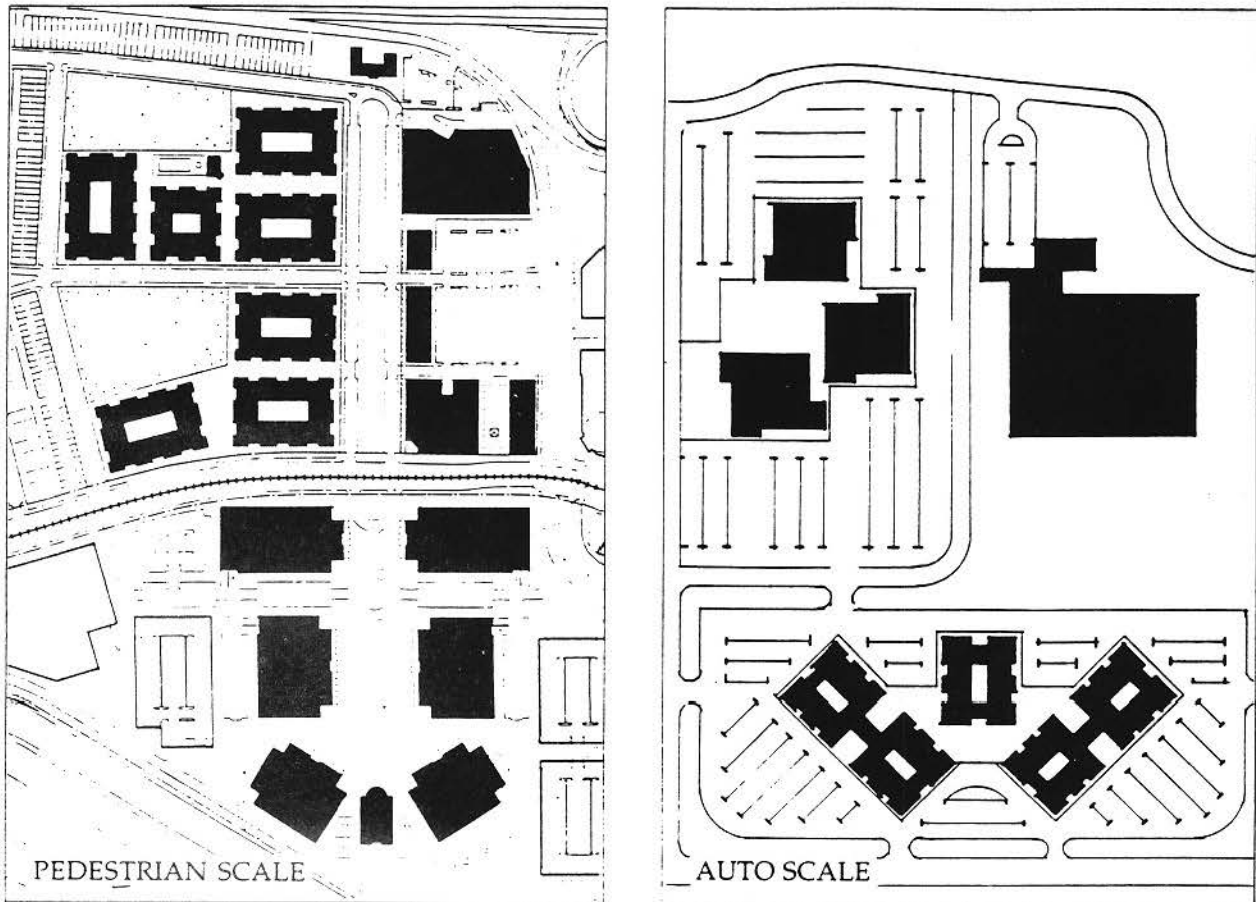


Figure 28: A fine grain, interconnected street pattern is more conducive to walking, because destinations are closer and routes are direct. A superblock street system often forces virtually all trips into the car.

Street patterns in most Activity Centers are disconnected: built solely for the efficiency of each office or shopping center developer and designed primarily for easy auto movement. Collector streets and cul-de-sacs branch off of the arterial street network, with few, if any linkages in between. This pattern forces all trips, whether by car or by foot, onto the arterial street system without regard for their ultimate destination. Consequently, few streets, other than the arterial, allow a pedestrian to walk to a nearby lunch spot or a transit station. Given this framework – the hostility of the

arterial network to pedestrians and the circuitous nature of the route – driving is automatically more convenient than walking. Thus, congestion and ever wider through streets are becoming the norm even in the newest Activity Centers.

In contrast, an interconnected internal street system, that provides linkages to local shopping and recreation destinations, as well as between adjacent developments, allows local trips to stay off of the arterial network. Streets that converge at Mixed-Use Nodes and transit stops provide

pedestrians with the option of walking for some trips in a safe and comfortable environment. Those that chose to drive may exit to the arterial system or may find a shorter and more direct route to a nearby local destination. And, with an interconnected street system that provides multiple routes to local destinations, any single street will be less likely to be overburdened by excessive traffic. Thus, streets should be designed to keep through trips on peripheral arterial streets and local trips within the Activity Center.

The regional traffic circulation system is dependent upon an efficient and smooth-flowing network of arterial and thoroughfare streets. However, Activity Centers are important regional destinations, where arterial and thoroughfare streets often converge. Where an arterial street passes through an Activity Center, traffic on that street should be slowed. The goal is to create a seamless "fabric" throughout an Activity Center. Thus, employment uses and Mixed-Use Nodes should not be separated by wide four- to six-lane streets or fast moving traffic; this creates a barrier for pedestrians and may be a disincentive for transit riders. Slower auto traffic can be accomplished with landscaped medians that create a "boulevard" effect and "landing spot" for pedestrians, special intersection improvements than narrow crosswalk distances, pedestrian-activated signals, and, in some cases, diverting traffic into a couplet configuration.

Transportation systems within Activity Centers should be designed to be "multimodal," considering the needs of pedestrians, transit, and autos. Each of these modes requires different and sometimes conflicting elements that must ultimately be balanced. For example, pedestrians want close destinations. They need

direct links to these destinations that are free of cul-de-sacs, parking lots, or massive intersections. They want safe, interesting, and comfortable streets to walk on and human scale in the buildings which line them. Pedestrians also are most likely to use transit during the daytime if it quickly extends their range of destinations. Transit, on the other hand, requires riders and often is most efficient if stops are spaced infrequently. This in turn calls for higher-density land uses, dedicated rights-of-way, station stops that are convenient and easy to reach by foot, and frequent headways. Most importantly, transit destinations need to be walkable so that riders are not stranded when they arrive.

The challenge is to introduce the needs of the pedestrian and transit into auto-dominated places and major destinations such as Activity Centers. To accomplish such a re-balancing, the Activity Center circulation framework should be layered, providing a peripheral arterial grid for through auto traffic; local streets for pedestrians, bicyclists, and slow cars; a transit system reinforced by intensified stations; and pedestrian-dominated Mixed-Use Nodes.

Street Design Principles

- *Provide Direct Routes to Local Destinations*
- *Create a Pedestrian Scale Block Pattern*
- *Plan for Local and Regional Travel Routes*
- *Use Multi-Modal Street Design*
- *Encourage Traffic Calming*
- *Link Bicycle Routes into Activity Centers*

Street Design Principles

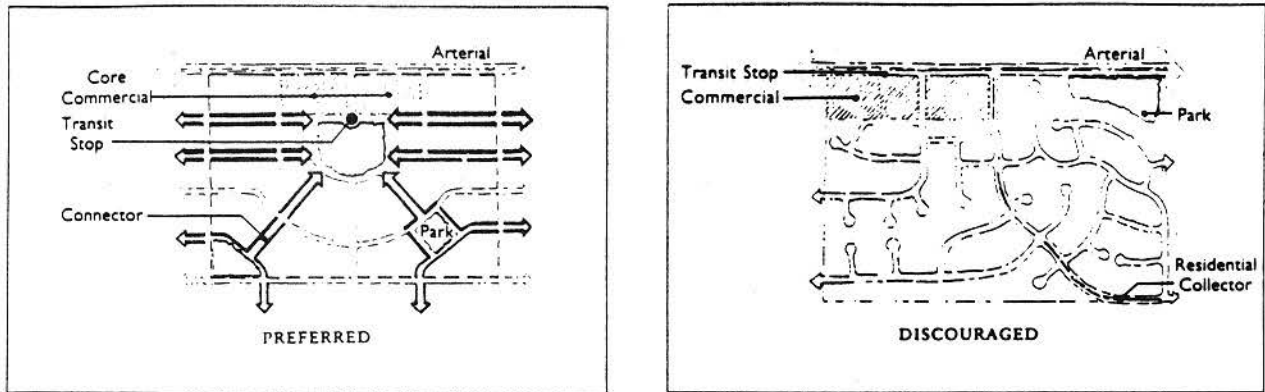


Figure 29: An interconnected street system provides direct routes to all destinations within an Activity Center as well as to regional roads. A cul-de-sac and collector street system forces virtually all traffic onto the arterial network.

Provide Direct Routes to Local Destinations

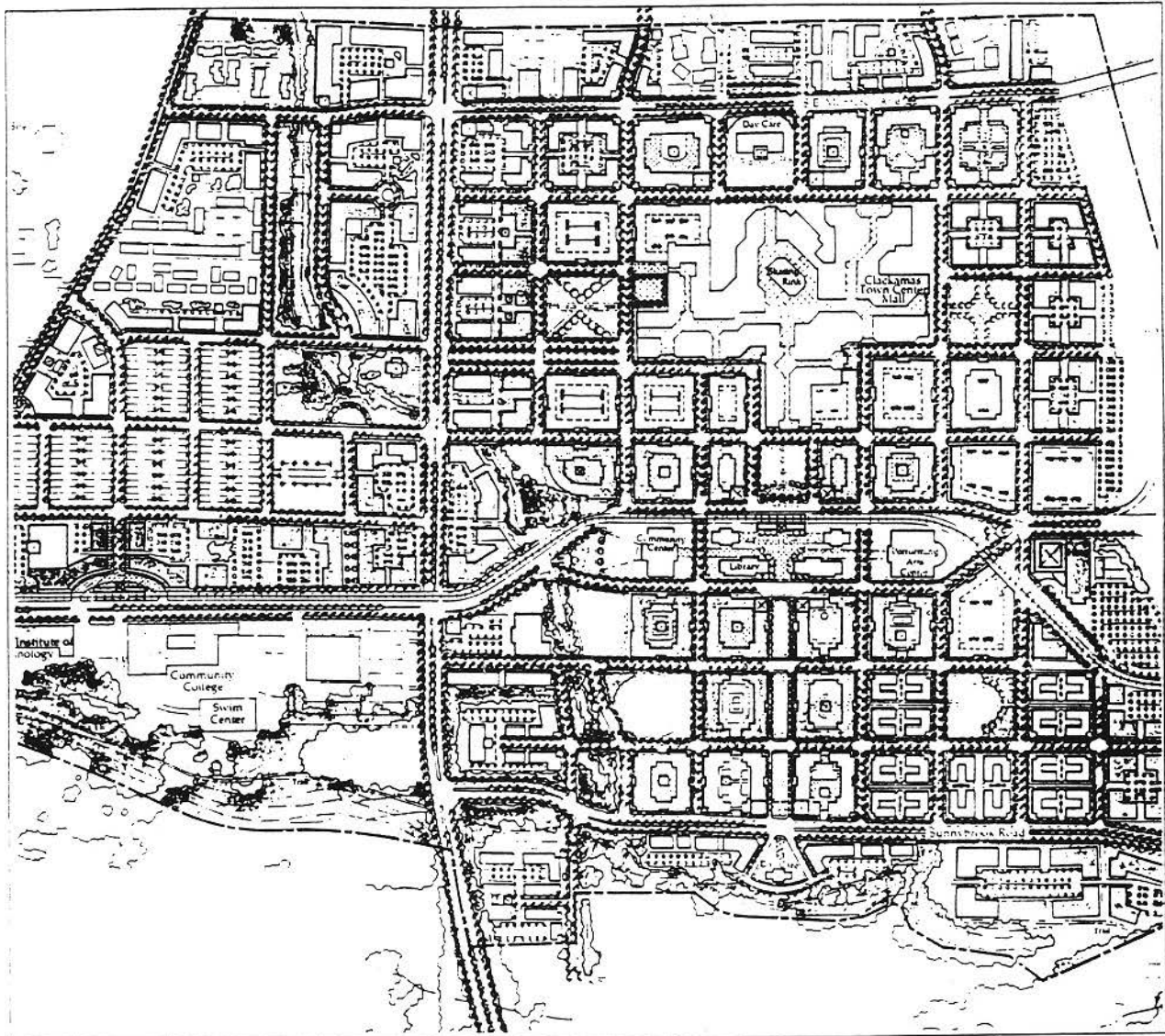
Streets in Activity Centers should provide multiple direct connections to local destinations, such as Mixed-Use Nodes, without requiring every trip to go onto the through arterial street network. Travel within Activity Centers should be distributed among “connector” and local streets that lead to through routes and more significant destinations. This type of street pattern reduces congestion on major streets, tends to shorten the length of trips in Activity Centers, and, because routes are more direct, they are more convenient for pedestrians and bicyclists.

Where an existing Activity Center has been developed with a “cul-de-sac to collector to arterial” street system, every effort should be made to identify potential street linkages that would allow greater internalization of trips within the center.

Create a Pedestrian Scale Block Pattern

Create a street and block pattern that is scaled to maximize convenience for pedestrians. A permeable urban fabric provides the greatest degree of access for pedestrians, while maintaining the vitality and safety of streets. Long and circuitous routes tend to discourage walking. Blocks sized between 60 and 120 meters (200 and 400 feet) are most appropriate.

Mid-block passages can often be worked into the fabric of an Activity Center that has been built with a “superblock” street system.



Retrofitting a Regional Mall

Clackamas Town Center is a 140,000 square meter (1.5 million square foot) regional mall outside of Portland, Oregon. Transit planners wanted to bring light rail to the shopping center and the community wanted to transform the site into a major new Activity Center. This plan calls for building new streets and buildings in the parking lots surrounding the mall. Scaled to match the street grid of downtown Portland, the new 60 x 60 meter (200 x 200 foot) blocks would be filled with multi-story mixed-use buildings containing offices, residences, ground floor retail, and structure parking.

Metro Region 2040.

Plan for Local and Regional Travel Routes

High volume arterial streets and thoroughfares should allow efficient conveyance of through regional traffic and, since they act as barriers to pedestrians, they must not pass through or separate Mixed-Use Nodes from surrounding office and residential districts.

If arterial street do pass through an Activity Center, they should be designed or re-designed to slow traffic, allow safe and frequent pedestrian crossings, and integrate transit. Techniques that can be used include: constructing medians in the center of four- to six-lane streets that serve as "landing spots" for pedestrians, special intersection improvements than narrow crosswalk distances, pedestrian-activated signals, and, in some cases, diverting traffic into a couplet configuration.

Use Multi-Modal Street Design

Local streets should be safe for bicyclists, pleasant to walk along, and functional for transit vehicles and autos. At a minimum, all streets should have continuous connected sidewalks and crosswalks at all intersections. Narrow, tree-lined local streets are preferred and they should be lined with building entries, ground floor retail, and/or residential units to bring activity into public spaces and provide "eyes on the street." Curb and gutter design, street lighting, planting strips, and street trees are important aspects of townscape and should reflect the unique character of individual districts within Activity Centers.

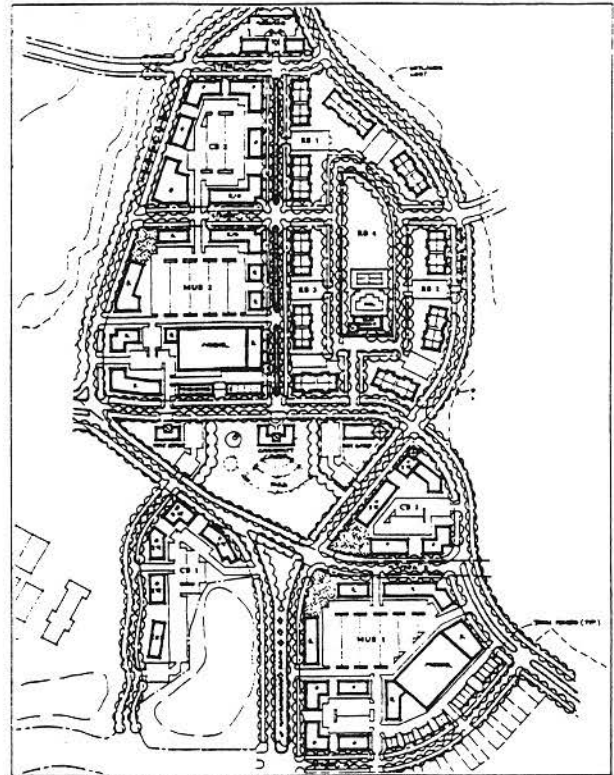


Figure 30: This Mixed-Use Node in Southeast Orlando, Florida was originally the site of the intersection of two six-lane arterial streets. The plan calls for dividing the two arterial streets into two sets of one-way couplets. This configuration reduces the number of lanes on any street to a maximum of three lanes and has the benefit of providing more commercial space that has "drive-by" visibility.

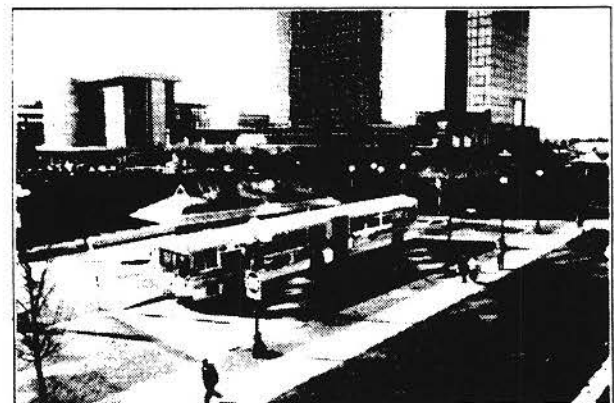


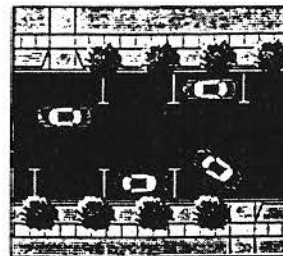
Figure 31: Multi-modal design integrates the service needs of pedestrians, bicyclists, transit, and cars into the configuration and design of streets.

Encourage Traffic Calming

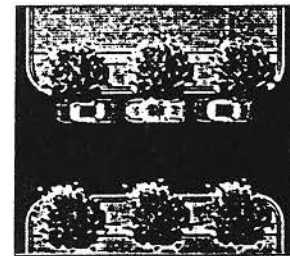
"Traffic calming" is an essential ingredient for creating a permeable, multi-modal street network. Traffic calming essentially means slowing auto traffic on local streets to speeds that are compatible with on-street bicyclists and comfortable for pedestrians and other sidewalk activities.

A variety of street design elements can be used to "calm" traffic, including:

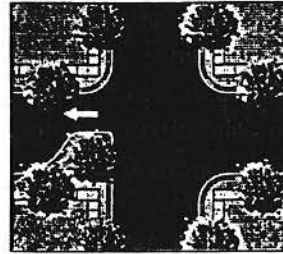
- **Narrow, Tree-Lined Streets** – at the most basic level, streets that are narrow, planted with a continuous tree canopy, and include sidewalks and on-street parking help slow traffic by reducing the unimpeded sight distances of drivers. Special efforts must be made, however, to maintain minimum access for emergency vehicles.
- **Bulbout Intersections** pavement is extended into the parking lanes at intersections to shorten crosswalk distances and slow cars making right turns.
- **Midblock Bulbouts** – Special crosswalks are sometimes appropriate at midblock locations. Crosswalk distances can be shortened with sidewalk bulbouts.
- **Roundabouts and Traffic Circles** – objects placed at the center of an intersection that force auto traffic to slow as they maneuver through the intersection. This technique is particularly popular as a retrofit strategy.
- **T-Intersections, Parks and Monuments** – in newly developing Activity Centers, streets that terminate into another street (making a "T" intersection) or go around parks or monuments help slow traffic as it passes through a district.
- **Speed Humps** – raised sections of pavement in the travel lanes force drivers to slow. Also a common, but sometimes controversial, retrofit strategy.



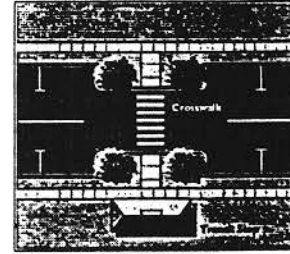
On-Street Parking



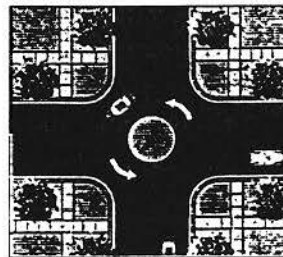
One-Side Parking



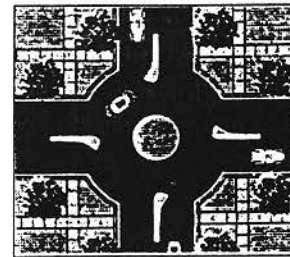
Bulbout Intersection



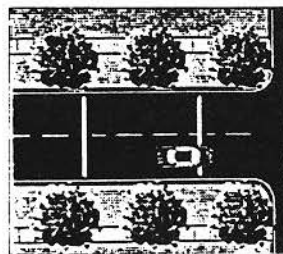
Midblock Bulbouts



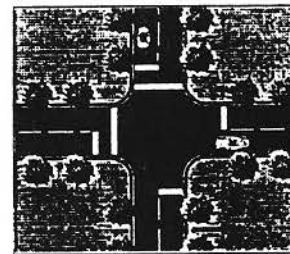
Traffic Circles



Roundabouts



Speedhumps



Raised Intersections

Figure 32: A variety of traffic calming measures can be integrated into street design to slow auto traffic and encourage bicycling, walking, and transit ridership. Courtesy of Walter Kulash.

Link Bicycle Routes into Activity Centers

Bicycling can be an important alternative to the auto for local trips, connections with the transit system, or commute trips. Create a network of bicycle-friendly routes within Activity Centers that provide linkages to Mixed-Use Nodes, as well as all major office, commercial, and residential districts. Bicycle routes should also connect with surrounding neighborhoods, nearby parks, and major transit centers.

Separated or marked bike lanes on several primary routes should be provided that allow commuter bicyclists to reach their destinations quickly and efficiently. Additional, recreation-oriented bicycle routes can be provided along greenways. Signs should direct riders to key destinations, such as shopping areas, transit stops, recreation facilities, and bike parking facilities.

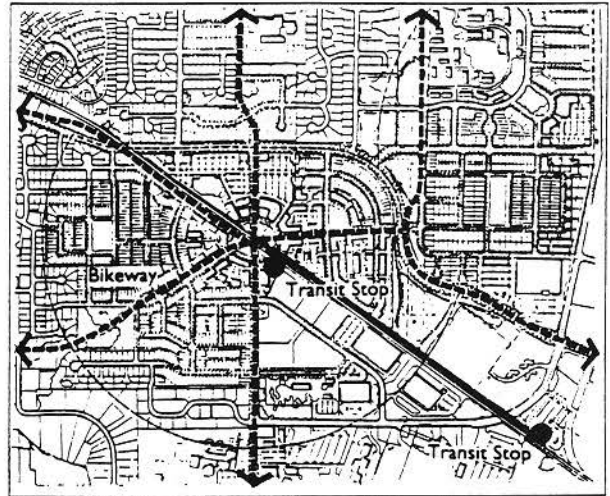


Figure 33: Bicycling can be a viable alternative travel mode if bicycle routes link Activity Centers with important destinations.

Design Principle #3: Pedestrian and Bicycle Orientation

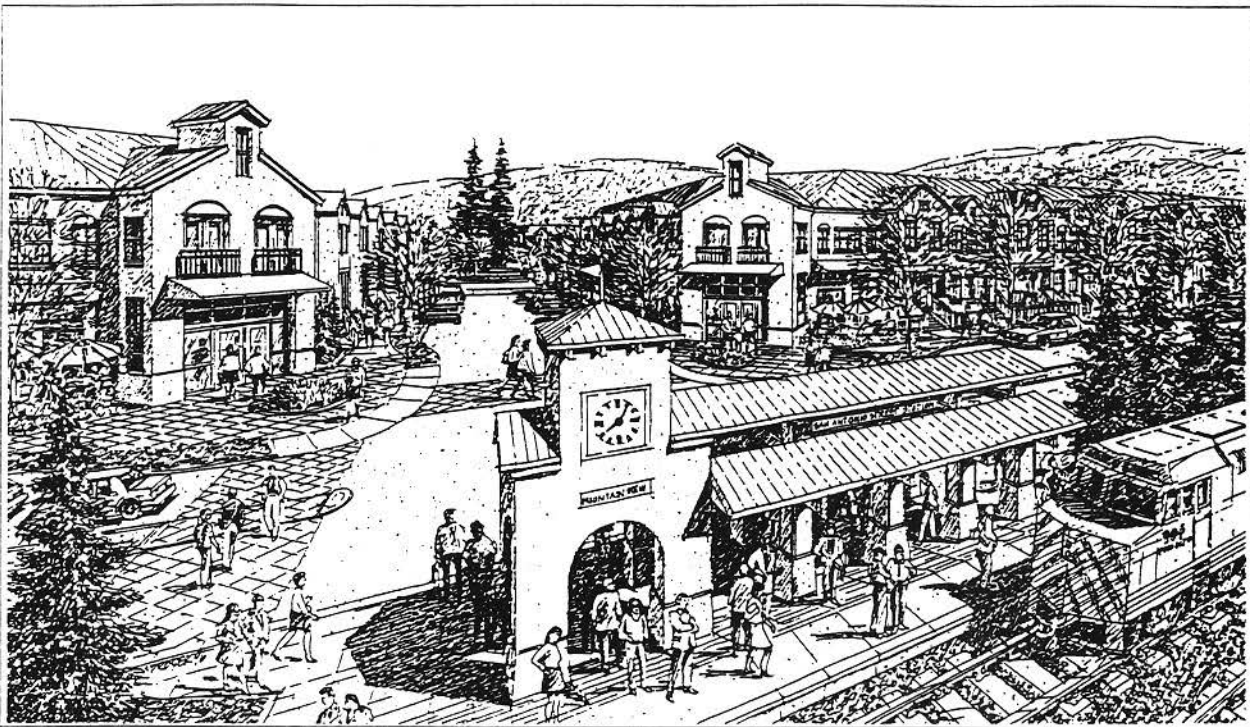


Figure 34: Buildings, streets, and parks should all be designed to make walking and bicycling easy and enjoyable.

The vitality of the pedestrian environment should be the basic measure of a successful Activity Center. The more people on the street in the morning, mid-day, and evening, the greater likelihood that auto congestion will be manageable, transit will be supported, and local retail will thrive. Once an area is seen as attractive and inviting, it becomes an increasingly desirable address for corporations and private businesses.

Reducing trip lengths and combining destinations are also enhanced by investing in the pedestrian infrastructure of Activity Centers. A walkable place is the best origin or destination for a transit trip, since a car is not needed at either end. Thus, a healthy walking environment can succeed without transit, but a transit system cannot exist without the

pedestrian. In fact, this type of development must precede, not just follow, the growth of transit networks. Activity Centers can exist without transit, but transit systems will have little chance of surviving in the low-density environment of sprawling suburbs without more mixed-use and pedestrian-oriented Activity Centers.

Pedestrian and Bicycle Design Principles

- *Orient Buildings to Streets*
- *Encourage Public Spaces and Sidewalk Activities*
- *Provide Pedestrian and Bicycle Amenities*

Pedestrian and Bicycle Design Principles

Orient Buildings to Streets

Buildings should address the street and sidewalk with entries, display windows, arcades, balconies, porches, architectural features, and activities which help create safe, pleasant walking environments. This is particularly important to achieve in Mixed-Use Nodes. Building designs should provide as much visual stimulus as possible, without creating a chaotic image. Buildings should incorporate street level design elements that draw in pedestrians and reinforce street activity. Variation and human-scale detail in architecture is encouraged.

Primary building entrances should be physically and visually oriented toward streets, parks, and plazas and not to the interior of blocks or to parking lots and garages. With the possible exception of larger retail stores, parking lots form most uses should be placed to the rear of buildings and on-street parking should be maximized. Secondary building entrances, oriented toward parking lots, may also be provided.

Where existing viable uses are separated from the street by large parking lots, infill is encouraged that provides a continuous pedestrian linkage from the street to the existing building entry. Even small retail shops placed within existing parking lots can create a pleasant walking environment.

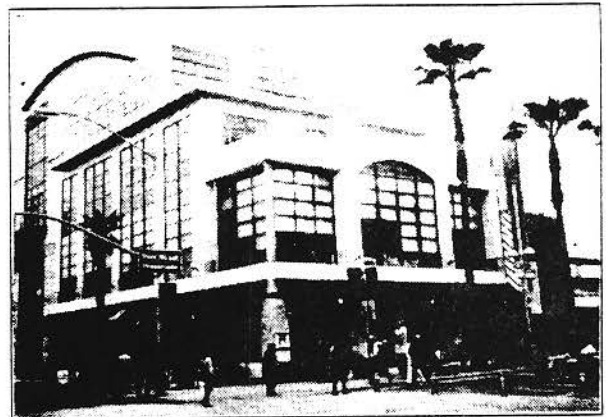


Figure 35: Santa Monica, California's design guidelines for the Third Street Promenade call for a number of pedestrian-oriented elements.

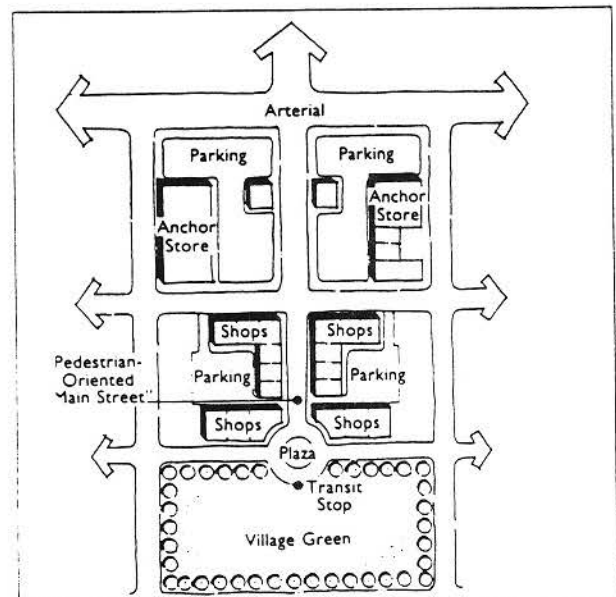


Figure 36: The design of Mixed-Use Nodes should balance pedestrian and auto comfort, commercial tenant visibility, and accessibility. Often a "hybrid" of pedestrian- and auto-oriented design can improve the experience and economic vitality of a node.

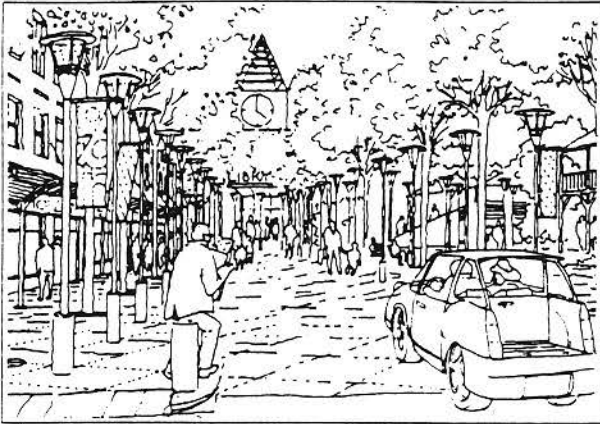


Figure 37: Buildings in Activity Center nodes should contribute to the "civic" realm, by providing activities at the street, arcades that shelter pedestrians from the weather, and a comfortable environment for both workers and visitors.

Encourage Public Spaces and Sidewalk Activities

Outdoor spaces and activities help create a certain level of vitality in a place and for some, are a key measure of the success of an Activity Center. Workers use outdoor spaces to relax at lunch time, residents need nearby parks to make urban living comfortable, and visitors see lively outdoor activities as a measure of an area's "entertainment value."

Mixed-Use Nodes should have both public spaces, such as plazas or parks, and sidewalk activities, such as outdoor restaurants and seating areas. If well designed, a central public outdoor space can establish the identity of an area that is remembered and recognized by visitors. Sidewalk cafes and restaurants help bring the street to life and are a clearly visible measure of the attractiveness of an area.

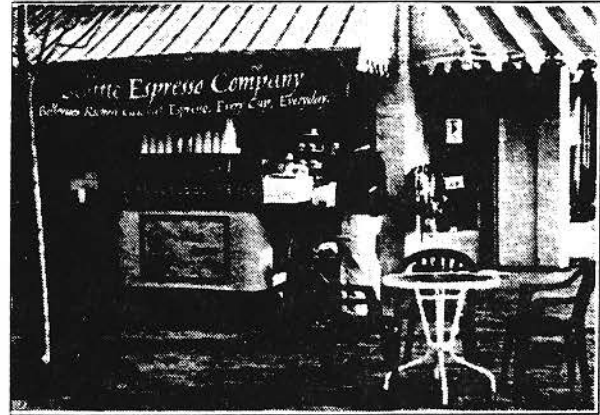


Figure 38: Bellevue, Washington has established a Density Bonus Incentive Program to encourage downtown developers to retrofit their properties to include more pedestrian-oriented amenities. Bonus points are given for outdoor spaces, street-side retail activities, and street furniture.

Provide Pedestrian and Bicycle Amenities

Benches, wide sidewalks, outdoor plazas and seating areas, pedestrian-scale street lighting, street trees, bulb-outs at intersections, medians, drinking fountains, public toilets, newsstands, kiosks, bike racks, transit stop signage all make an area more useful and enticing for pedestrians and bicyclists. Every effort should be made to integrate them into the planning or retrofit of an Activity Center.

Design Principle #4: Frequent and Reliable Transit

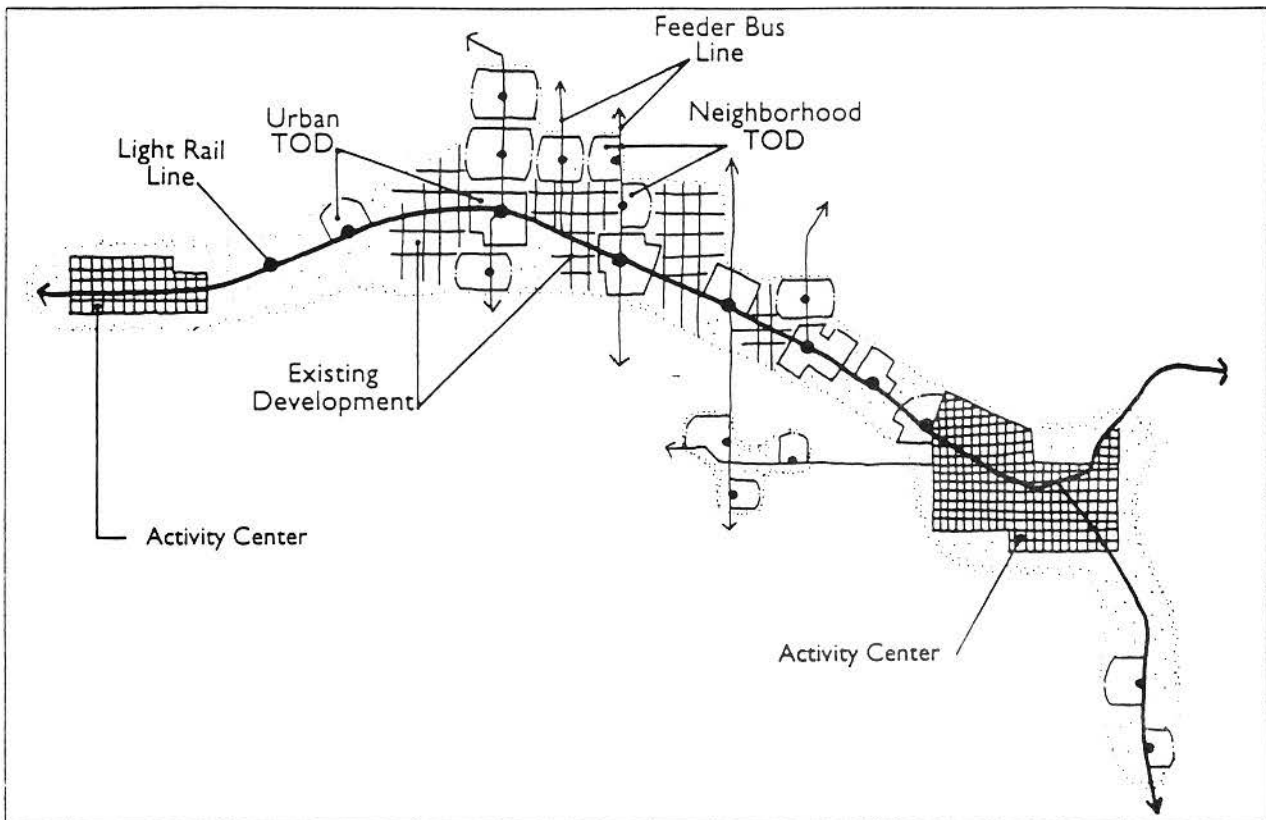


Figure 39: Activity Centers should be among the most important destinations on a suburb-to-suburb transit network.

As suburb-to-suburb transit systems are being considered in expanding regions throughout the country, the efficiency of the transit system will be determined, in part, on the density of potential patrons and the ability to link up major destinations.

Too often transit lines are located in areas that are not transit-supportive because they have too little density, no pedestrian qualities, and little opportunity for intensification. Lines through existing suburbs often make this mistake and become dominated by a “park-and-ride” auto access strategy. The alternative is to run alignments run through high density, mixed-use Activity Centers and link these employment

centers with surrounding residential neighborhoods. The research finding mentioned earlier in this report showing that Activity Centers fed by radial transit lines show transit ridership levels 6% higher than centers served by a single transit connection, would seem to support this approach.

Accessibility is the key to successful transit ridership. A centrally located transit stop is closest to the greatest number of employees and residents. Transit stops should provide pleasant and convenient access to local destinations and job centers. Ideally, the transit stop should be placed within Mixed-Use Nodes and on-site circulator shuttle routes should loop through the

Activity Center distributing workers to their job sites. Commercial uses should be located so that at least a portion of the retail is directly accessible from the transit stop via sidewalks and visible pedestrian connections.

Existing railroad or freeway rights-of-way play a large role in determining the routing of fixed rail transit lines, such as light rail, elevated rail, or commuter rail. Railroad rights-of-way typically have substantial quantities of undeveloped and underdeveloped properties along their length and thus provide the best opportunities for transit-oriented infill. Using freeway rights-of-way though, often precludes sites viable for mixed use development and comfortable pedestrian access precisely because they are adjacent to speeding traffic and high volume corridors.

Activity Centers that extend along bus routes should respond to the linear nature of the transit line by forming a series of transit-oriented nodes, rather than perpetuating current strip commercial patterns. Where possible, bus routes should follow parallel connector streets that feed directly into the core commercial areas, thus helping to separate through traffic and transit operations. Where bus stops must be located along arterials, crosswalk improvements and medians should be provided to facilitate frequent pedestrian crossings.

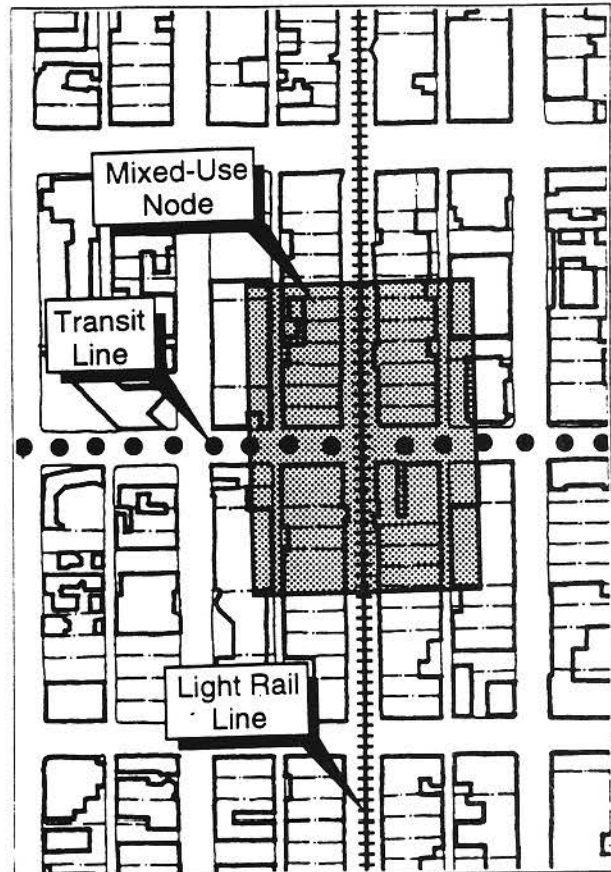


Figure 40: The most transit-oriented Activity Centers are served by several interconnecting transit lines. Mixed-Use Nodes are placed at each transfer point.

Transit Design Principles

- *Locate Major Transit Stops in Activity Centers*
- *Link Service Levels to Development Intensities*
- *Locate Major Stops in Mixed-Use Nodes*
- *Provide Shelter and Services at Transit Stops and Stations*

Transit Design Principles

Locate Major Transit Stops in Activity Centers

Reinforce the regional transit system by locating Activity Centers at major trunk line transit stops (subway, elevated rail, light rail, commuter rail, or express bus). Activity Centers should be planned and designed as regional transit hubs and stations for timed transfers to local feeder bus service or on-site circulator transit systems.

Link Service Levels to Development Intensity

Transit lines should define the density, location, and quality of growth in a region or sub-region. They should be located to allow maximum area for new transit-oriented development, to access existing transit-viable Activity Centers, and to serve prime redevelopable or infill sites.

Locate Major Stops in Mixed-Use Nodes

Primary transit stops or stations should be centrally located within an Activity Center and, wherever possible, the focus of a Mixed-Use Node. Commercial uses should be directly visible and accessible from the transit stop.

Provide Shelter and Services at Transit Stops and Stations

Comfortable waiting areas, appropriate for year-round weather conditions, should be provided at all transit stops. Their design should also emphasize safety and security through the use of clear glass or other transparent materials, human-scaled lighting, legible signage, and in some cases, police call boxes.

Transit stations (light rail, subway, commuter rail, or bus transfer centers) should provide additional services and amenities, such as passenger drop-off zones, bicycle lockers, regional and local maps, telephones, newsstands, quick-stop coffee/food service, and security personnel.

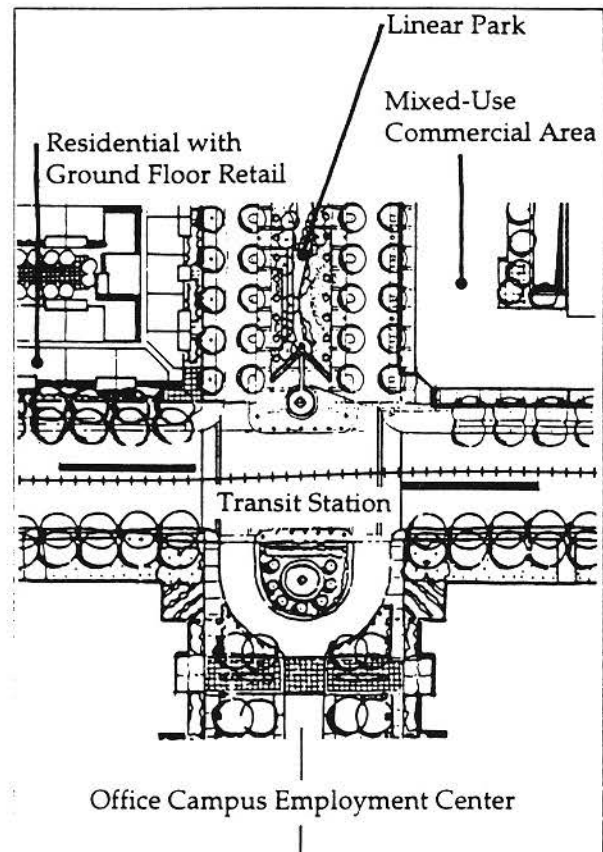


Figure 41: Transit stations should be located so that offices, services, and housing are immediately accessible on foot.

Design Principle #5: Appropriate Parking Configuration & Minimization

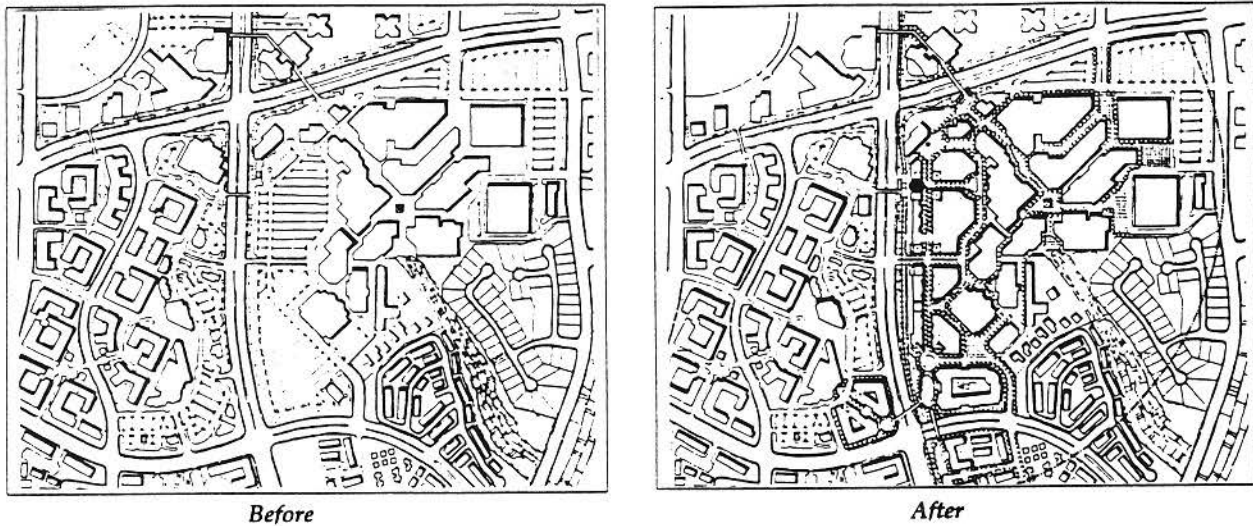


Figure 42: Over time, as an Activity Center matures, infill in existing parking lots can be financially feasible and help make the center more efficient.

Parking lots often comprise two-thirds of the land area of suburban developments when conventional off-street parking requirements are utilized. Typically based on making parking immediately available on the busiest days of the year, parking standards assume that each land use has a maximum supply of spaces on its own site. On-street parking and spaces reserved for off-hours usage are rarely considered for use during times of peak demand. As an added incentive, parking is either free or very low cost. In most Activity Centers, these surface parking lots are placed around buildings. This separates them from streets, sidewalks, and transit stops, forcing pedestrians to cross large expanses of asphalt before reaching any destination.

This combination of factors: 1) ample supplies of parking; 2) free or very low cost parking; and 3) parking lots that separate buildings from pedestrian destinations tends to work against the

ideal of making transit- and pedestrian-oriented Activity Centers. However, developing a strategy for encouraging more efficient Activity Centers requires a careful balancing of market realities and multi-modal travel priorities. The following design principles for parking in Activity Centers are suggested as a series of incremental efforts that can be implemented over time, depending on the strength of a particular regional office market and local development practices.

As a first step, reconfiguring the location of on-site parking lots can make a significant impact on the quality of the pedestrian experience. As mentioned previously, placing buildings next to streets and locating parking behind buildings helps create an environment where walking is interesting and enjoyable. Such an approach may also be market-wise, as retail tenants and major employers will receive better visibility from streets, while still maintaining ample

supplies of nearby parking. Reconfiguring the location of parking lots is obviously easiest to achieve in newly developing areas, though any infill and redevelopment in an existing Activity Center should follow this guideline.

As a second incremental step, shared parking should be encouraged as a strategy to better utilize land in Activity Centers, especially near transit. Projects with a mix of uses can reduce the total number of parking spaces by comparing peak demand of each use by time of day, day of the week, and season. Where the varied parking demand for proximate uses allows shared use of a single parking spot, the total amount of parking for both uses should be reduced. Shared parking lots should be conveniently located to all uses, but need not be located on the same parcel.

Utilizing on-street parking spaces to fulfill a portion of the total parking requirement will also help reduce the amount of land devoted to parking, while continuing to provide the necessary total amount of parking spaces. The number of on-street parking spaces available on the contiguous street frontage of retail office, or public use sites, should be counted against the total required number of parking spaces. On-street parking also acts as a traffic calming technique, since drivers tend to travel slower with cars parked on either side of the street and it serves as a protective barrier for pedestrians.

Once a precedent has been set for encouraging non-auto commuting, minimum and maximum parking standards, set at levels that are below those currently allowed in most conventional suburban settings, should be considered. Minimum requirements help to avoid "spillover" parking in retail areas or nearby neighborhoods; maximum parking standards

guard against overly generous parking supplies that discourage transit use and contribute to construction of larger surface parking lots.

Opportunities for redeveloping existing surface parking lots with buildings and structured parking should be strongly pursued once market demand for structured parking and high intensity land uses can be demonstrated. Land in the vicinity of the transit stop should be developed with the greatest intensity in order to provide the greatest number of opportunities for transit ridership. As land values increase, redevelopment of surface parking lots to more intensive uses should be considered.

Many experts believe that the only true incentive that will entice commuters out of their cars is to set the price of parking higher than the cost of transit. This strategy has long been used in central cities with very impressive results, but has rarely been tested in Suburban Activity Centers. Priced parking programs must not create a built-in incentive to locate office and employment-generating uses in other non-transit locations. And, some relief for commuters can be provided by building intercept commuter parking at the periphery of the Activity Center.

Parking Design Principles

- *Configure Parking to Balance the Needs of Pedestrians and Cars*
- *Strongly Encourage Shared and On-Street Parking*
- *Establish Minimum and Maximum Parking Standards*
- *Redevelop Surface Lots with Structured Parking*
- *Require Priced Parking*
- *Provide Intercept Commuter Parking*

Parking Design Principles

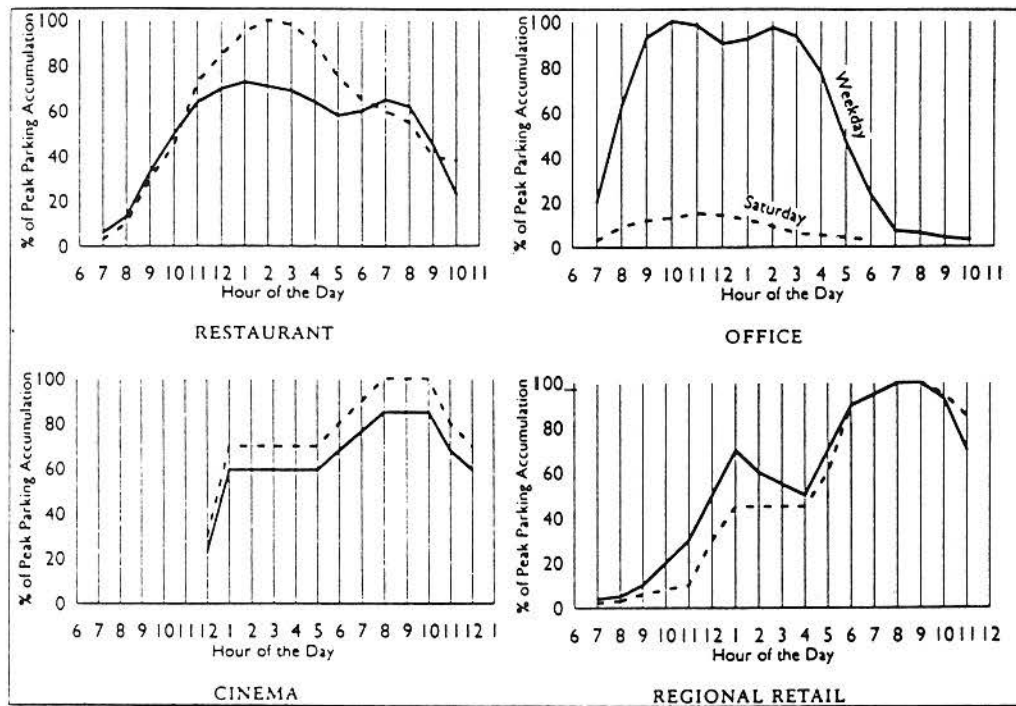


Figure 43: Shared parking standards can effectively allow previously underutilized areas to be redeveloped with a mix of employment and entertainment uses.

Configure Parking to Balance the Needs of Pedestrians and Cars

Parking lots should not dominate the frontage of pedestrian-oriented streets, interrupt pedestrian routes, or negatively impact surrounding residential neighborhoods. Lots should be located behind buildings or in the interior of a block, whenever possible. Large surface parking lots should be visually and functionally segmented into several smaller lots with buildings, streets, and tree-lined walkways.

Strongly Encourage Shared and On-Street Parking

Shared parking allowances are recommended for adjacent uses with staggered peak periods of demand. Retail, office, and entertainment uses should share parking areas and quantities. To reduce the size of off-street parking lots, a portion of any project's parking requirements should be satisfied by on-street parking.

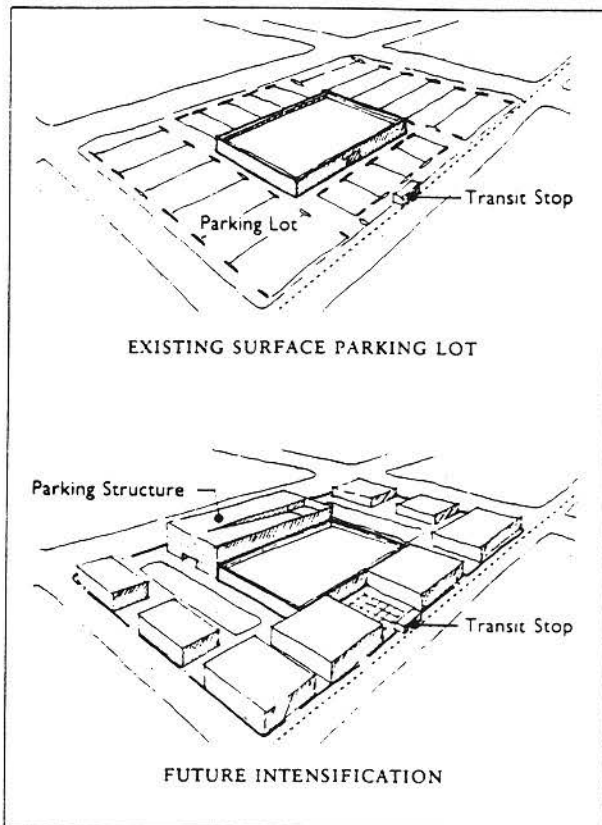


Figure 44: As an Activity Center matures, opportunities for redeveloping surface parking lots with structured parking and new land uses becomes more viable.

Establish Minimum and Maximum Parking Standards

Reduced parking standards should be applied to transit-served Activity Centers in recognition of the ability of employees to reach their jobs within a car, their walkable environment, and walkable convenience destinations. Setting minimum as well as maximum standards encourages a developer to reduce the amount of parking that is provided, but builds in a degree of flexibility in response to changing market conditions or conservative lending practices. On-street parking should count toward these maximum standards.

Redevelop Surface Lots with Structured Parking

Over time, land devoted to surface parking lots, particularly in areas within walking distance of a trunk line transit stop, should be reduced through redevelopment and construction of structured parking facilities.

Require Priced Parking

Set parking costs on an Activity Center-wide basis or better, a regional basis, to be higher than the cost of a typical transit trip. The pricing system should discourage employee all day parking, but permit or even encourage parking for short term shoppers. Shoppers should be able to easily park once and take care of several errands before moving their car.

Provide Intercept Commuter Parking

Once parking limits and prices are set within the Activity Center core area, satellite parking lots or structures for employees who must drive may be built in peripheral locations. Pedestrian-friendly connections and/or shuttle service should link satellite parking with Activity Center nodes.

Chapter 6: Implementation Strategies

The Implementation Process

Building or redeveloping an Activity Center is an ambitious process that takes place over a long period of time. While its focus is typically physical planning and economics, it is also a process of building partnerships. Neither the public sector nor the private sector has, by itself, all the necessary resources to accomplish the project alone. Nor do they always have the luxury of thinking with a "big picture." Developers will want to ensure that proposals make economic sense and thus need to understand all potential costs. Transit agencies must wait for new development to bring ridership, before adding new transit service. Local governments often don't have the staff resources to devote to long term planning programs. Additionally, efforts on the scale of an Activity Center also require cooperation among various jurisdictions and levels of government. So, state and regional agencies need to get used to being players in site-specific programs.

Overcoming these obstacles will require a concerted effort by local government and

developers, along with support from community leaders, encouragement from regional agencies, and regulatory and financial assistance from federal agencies. The key is to assemble a critical mass of resources, skills, and enthusiasm in which different people with different interests can work as partners toward making a vision into reality.

Making the implementation process work means bringing together the wide range of players who have an interest in its outcome. Local officials, planners, transit agencies, business groups, community development organizations, developers, and other interested parties need to come together early in the planning stages to discuss common concerns and clarify a vision. Once the scope of the problem has been assessed, plans and possible implementation strategies should be identified and tested. Focusing early on implementation forces participants to be practical and oriented toward problem-solving. Too often, plans are set aside and forgotten shortly after they are adopted because they are vague or fail to

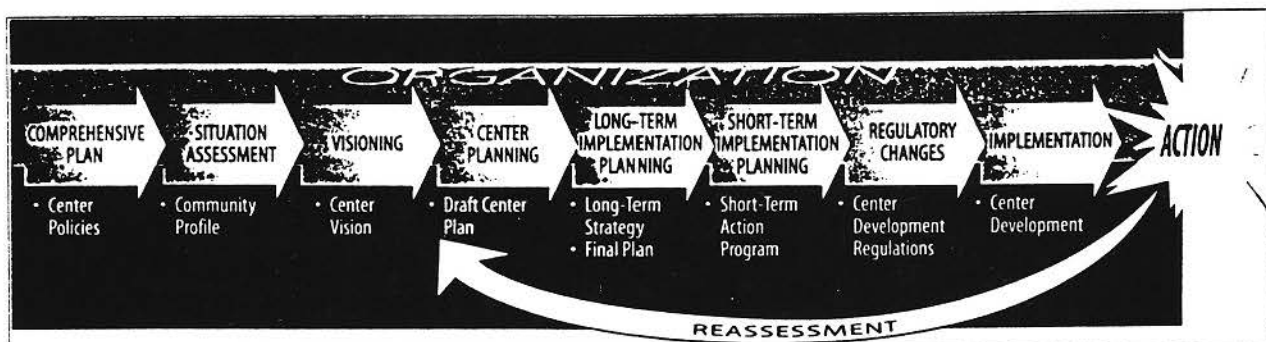


Figure 45: the Implementation Process is a reiterative one. Issues and options should be reviewed from all perspectives. From: *Developing Your Center: A Step-by-Step Approach*, Puget Sound Regional Council.

address key constraints, such as market trends, public spending capacities, or other crucial factors.

After an initial strategy has been crafted, participants should “recycle” through the process. This provides an opportunity to refine initial recommendations and work toward gaining commitments from all parties as to their future roles and responsibilities.

Implementation Strategies

The following are a series of strategies that can be used to implement the concepts presented in the previous Design Principles section. They have been grouped according to the agency or entity most likely to use them: Federal, State, or Local agency. In each case, the strategy or implementation tool is described and, where appropriate, examples are provided to illustrate how they might be applied.

These implementation strategies are intended as a “toolbox” of programs that could be used to encourage efficient centers. They have been culled from regions and communities throughout the country and represent a great diversity of ideas about what has been most successful. Not all programs will be appropriate in every situation. Users should consider this a menu of options from which a locally-appropriate comprehensive strategy can be crafted.

Figure 46

**Implementation Strategies
for Suburban Activity Centers**

Federal	Regional	Local
<ul style="list-style-type: none"> • Intermodal Surface Transportation Efficiency Act • Financial incentives for transit-oriented development • Interagency coordination • Support innovative transit technologies • Incentives for good design 	<ul style="list-style-type: none"> • Integrate land use and transportation in regional plans • Criteria for funding transportation and infrastructure improvements • Design guidelines and model zoning codes • Urban growth boundaries • Regional tax sharing • Transportation demand management programs • Parking management programs • Community visioning & education 	<ul style="list-style-type: none"> • Build local leadership & vision • General plans & comprehensive plans • Zoning • Specific plan areas • Density bonuses • Multi-modal street standards • Alternative parking standards • Design Review • Redevelopment authority • Capital improvement budget priorities • Local shuttle systems • Transportation demand management programs

Federal Policies and Programs

Intermodal Surface Transportation Efficiency Act

Use ISTEA Funds to Support Efficient Activity Centers and to Retrofit Auto-Oriented Centers

As part of its shift from a federally dominated construction program to a federally funded partnership for productive investment in transportation, the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) asked States and Metropolitan Planning Organizations to prepare long range plans and financially reasonable funding programs. The law empowered a new partnership for metropolitan transportation between State agencies and metropolitan planning organizations as a cooperative effort with local governments. This provides an opportunity to demonstrate how new planning ideas – ones that promote multi-modal transportation systems by linking land use with transportation planning – can be accomplished. Activity Centers are ideal locations to demonstrate these concepts. They are often the primary job centers of regions and represent significant investments in public transportation infrastructure and significant private investment in buildings, amenities, and local streets. ISTEA funding should be used to not only demonstrate a commitment to these principles, but to serve as a catalyst for additional private investment. These concepts should be incorporated into the legislation that reauthorizes the ISTEA program.

Financial Incentives for Transit-Oriented Development

Create a package of programs that provide financial incentives for transit-oriented Activity Centers.

One artificial barrier to free choice in transportation and housing stems from existing mortgage lending rules. These rules do not consider the financial burden of commuting by car or from more remote locations. Most loans are made on the basis of income. Disregarding travel costs encourages home purchases in outlying areas which are often less expensive. Unfortunately, living at the edge of a region also means being far from jobs, schools, cultural, and social events. Government actions should encourage lending institutions to revise their location-neutral lending policies to account for the real cost of driving.

Possible programs include:

- **Extending Mortgage Insurance Program to Mixed-Use, Transit-Oriented Activity Centers** – Current lending practices make receiving loans for mixed-use development particularly difficult. Private investment in location-efficient and amenity-rich developments may, in the short term, require a leg up. Extending mortgage insurance to these locations is one form of assistance.
- **Creating a Secondary Mortgage Market for Mixed-Use, Transit-Oriented Activity Centers** – Private investment is cautious and careful. After World War II, the Federal government created a secondary mortgage market for single-family homes; a new program should be created to financially support mixed-use, transit-oriented development.
- **Permitting Location-Efficient Mortgages** – Families that wish to locate in Transit-

Oriented Activity Centers would benefit from a new underwriting program that converted transportation savings resulting from locating near transit and amenities into purchasing power for a larger mortgage.

The Cost of Living in the Suburbs.

A study led by the Bank of America comparing California household transportation costs showed that auto-related expenses are twice as high in auto-dependent outlying suburbs as compared with mixed-use locations that are well served by transit - an average difference of \$9,000 in discretionary household income (measured in 1989 dollars). Government actions have the opportunity encourage lending institutions to revise their location-neutral lending policies to include the real costs of driving. ("Beyond Sprawl: New Patterns of Growth to Fit the New California," 1995.)

Interagency Coordination

Encourage projects that maximize cooperation between Federal agencies, and thus utilize public resources efficiently and effectively.

In this era of tight government spending, programs that make the best use of public funds are most likely to receive on-going support. One way to "reinvent government," is to encourage, wherever possible, collaborative efforts among Federal agencies. To date, few programs have made the cross-over between agencies. Jointly-developed and managed programs will help to not only avoid unnecessary duplication of effort and budgets, but can work to focus resources on our region's most difficult problems.

Possible topics for multi-agency action include:

- **Brownfield Remediation** - One common barrier to development in existing communities is toxic soil or "brownfield" sites, which are expensive to clean up. A collaborative effort on the part of the Environmental Protection Agency (EPA), the Department of Transportation (DOT), and Housing and Urban Development (HUD) could target brownfields for both financial and technical resources to prepare a site for development as an Activity Center, re-connect street systems, integrate transit, and help attract new businesses to the area.
- **Integrated Regional Planning** - The viability of Activity Centers is due, in part, to the investments made in the regional roadway systems, transit networks, and other public services. A cooperative effort between DOT and HUD could develop a strategy for prioritizing regional infrastructure systems and linking this with the location of housing and economic development investments.

Support Innovative Transit Technologies

Support the creation of new technologies that make transit more viable.

Just as technological innovations propelled the automobile into its current dominance, so too can technologies make transit more popular for reasons of cost, construction, lifestyle, and aesthetics. Technological innovations are now available that have the potential to make transit less expensive to build and operate, more flexible in terms of routing and departure times, and more fun to ride with fewer bumps and no fumes. Just a few of the most promising transit innovations include:

- **Cost-effective & flexible new technologies** – Lightweight materials, self-propelled diesel transit, and electric-based technologies are leading to rail that is not only energy-efficient, but more flexible and less expensive to build. Savings can be achieved in right-of-way costs, as well as the construction of rail beds and bridges. Lightweight materials and electric engines are also making shuttle buses more economical and comfortable, with no fumes and noise.
- **Flexible schedule technologies** – New transit systems are being developed that give service “on-demand” by using small electric vehicles on rail or roadways. Small vehicles using guidance systems and absent drivers could be kept in waiting at major departure/destination points. These systems have the advantage of reduced travel times as well as improved energy efficiency and air quality. With labor comprising a significant portion of transit’s typical operating costs, this new technology should prove to be cost effective as well. The fixed route character of these systems can also be used in land use and transportation planning to reinforce Activity Centers as major destinations.

Diesel light rail vehicles (DLRVs) and Diesel Multiple Units (DMUs): An inexpensive rail transit alternative.

A number of regions are looking at diesel rail technology as an inexpensive alternative to light rail or other fixed rail systems. DLRVs and DMUs use existing railroad tracks for transit purposes and in some cases, continue to allow freight service. In Europe and Canada they have proven to be less expensive to build and operate than locomotive-hauled passenger trains on low density rail lines. Capital costs for a DLRV system are typically under \$650,000 per kilometer (\$1 million per mile), depending on the number and frequency of stations; train stock is between \$0.75 and \$1.35 million per car. In comparison, the Denver light rail system, which involved right-of-way purchase and a new set of tracks cost an average of \$10 million per kilometer (\$16 million per mile) and is considered one of the least expensive systems in the country. (Sonoma-Marin Land Use and Transportation Study, 1996)

Incentives for Good Design

Recognize efforts by local government to create pedestrian- and transit-oriented Activity Centers through awards, special technical assistance, and financial programs.

Many communities have found that the best advertising for new approaches to development are “on the ground” examples. A skeptical developer or citizen can often be persuaded that pedestrian- and transit-oriented design approaches will work once they visit an exemplary site. This is a key reason that local governments that promote good design in Activity Centers should be supported and awarded. These leaders are not only breaking new ground, but are providing a valuable service to others who may wish to try similar approaches. The Livable Communities Initiative, sponsored by the Department of Transportation, provides such support through awards as well as technical and financial assistance.

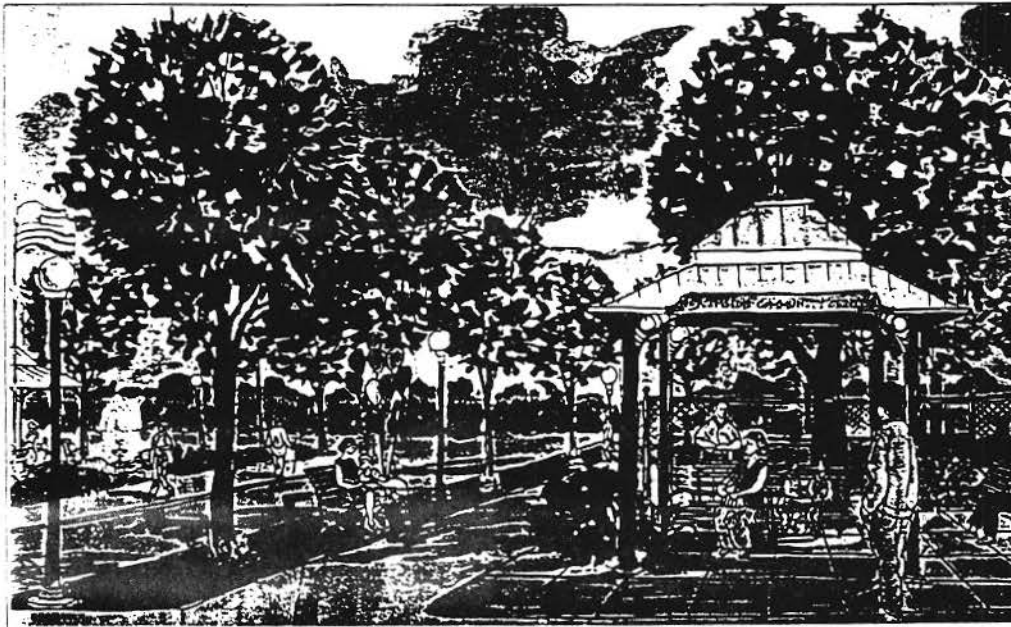


Figure 47: This transit station in Corpus Christi, Texas recently received an award from the U.S. Department of Transportation as part of their Livable Communities Initiative.

Regional Regulatory and Advisory Efforts

Integrate Land Use & Transportation in Regional Plans

Use Regional Plans to identify transit-based locations for Activity Centers. Locate Activity Centers to take strategically advantage of existing and planned regional transit and transportation facilities. Target planned transportation improvements to reinforce Activity Centers as regionally-significant nodes of employment, housing, and services. Use an integrated land use and transportation policy plan to set priorities for Metropolitan Investment Strategies.

The shape of a region – its transportation corridors, activity nodes, and edge – are critical to its long-range economic viability and the health of Activity Centers. In a region where land use and transportation policies are coordinated, Activity Center employers have easy and affordable access to a qualified labor force, and Activity Center residents have convenient access and affordable access to the region's jobs. Giving priority to transportation connections that reinforce the primacy of city centers and Activity Centers, strengthens their accessibility and marketability, and reduces reliance on cars and parking-dominated landscapes.

Regional Plans that integrate land use and transportation policy have the potential to reduce commute time and costs, while enhancing the long-term economic viability and livability of regions. Activity Centers with significant concentrations of jobs should be located at major stations along the existing and planned regional trunk transit network. Rail service to Activity Centers appears to be more efficient than bus service, because of its

frequency, reliability, and speed, however in low density regions, suburb-to-suburb transit will continue to be provided by bus. Land use scenarios based on these concepts should be tested and refined through both traffic modeling exercises and community meetings.

Land Use and Transportation Connections.

Taking advantage of Portland, Oregon's Urban Growth Boundary (UGB) and Metro, Portland's regional planning agency, 1000 Friends of Oregon assessed the impacts of not increasing density in the fastest-growing suburban county in the region, but instead, simply relocating planned densities to transit-served areas. Under the "LUTRAQ Alternative," instead of 16 percent of future development located near transit, about 65 percent of new homes and 78 percent of new jobs would be within walking distance of transit service. The LUTRAQ Alternative produced less vehicle kilometers/miles traveled and less hours of vehicle delay than either (1) building no new freeways, or (2) building a new freeway outside the UGB.

The Cost of Sprawl.

A study by the Real Estate Research Corporation in 1974 found that compact forms of development could reduce costs of development and lead to savings for both developers and governments. 18 years later, a Rutgers University study also demonstrated cost savings from compact development. They found that, over 20 years, a compact land use and transportation approach would save the State of New Jersey \$1.3 billion in capital costs and over \$7 billion in operation and management costs. (The Impact Assessment of the New Jersey Interim Development and Redevelopment Plan, Rutgers University.)

Criteria for Funding Transportation and Infrastructure Improvements

Prioritize funding for transit projects that serve Activity Centers and pedestrian and bicycle enhancements that help make Activity Centers multi-modal. Avoid transportation improvements that accommodate sprawl and call for the inefficient use of public tax dollars to serve dispersed and auto-dependent areas. Emphasize reinvestment in existing communities, over new growth in peripheral locations.

Transportation improvements, along with other infrastructure, are critical elements in how regions and Activity Centers grow. If not properly prioritized, the public expenditures for transit and infrastructure improvements can easily lead to sprawl, congestion, inefficient transit, loss of open space, and air pollution.

Fostering coherent regional land use patterns should be a primary criteria for public investments in roads and other forms of infrastructure. Performance standards should be set for transportation and infrastructure investments to shape efficient regions and secure healthy Activity Centers. Transportation investments leverage economic development, and, if properly applied, can provide the framework for efficient and beneficial growth that places jobs and homes within walking distance of transit. Performance standards (implemented through ISTEA project scoring systems) should establish minimum criteria related to land use and urban form that all developments must meet in order to receive precious transportation and infrastructure funds. In this way, Activity Centers that are built on a model of compact, transit-oriented patterns will be favored to receive funding, over low-density, single-use developments.

Transportation costs of decentralization

Transportation investments that contribute to urban sprawl have not only led to less efficient use of public funds in the form of more roads per resident or worker, they have also led to enormous time costs for employees and residents. Over the last decade in the San Francisco Bay Area, the amount of time commuters sit motionless on local freeways has increased by 15.6 percent. In 1989, traffic congestion will consume nearly four times as many person-hours as it did in 1980. The reason behind this increase in clogged freeways is the dramatic surge in the number of vehicles and vehicle kilometers/miles traveled. According to California's Department of Transportation, the number of registered automobiles in the Bay Area has increased by two percent each year, while total vehicle-miles have risen 4.2 percent annually. The Department's "point surveys" shows that a large portion of this increase can be attributed to low-density housing beyond the Bay Area's urban centers. CalTrans forecasts that to keep up with the demand for roads, it will have to widen major highways up to 24 lanes by 2005 – just to keep up with current levels of service. (Source: Reviving the Sustainable Metropolis; CalTrans; San Francisco Examiner, Oct. 6, 1987; and, San Francisco Chronicle, Feb. 8, 1989.

Transportation priorities

Often transit agencies measure "improvement" in terms of expansion. In 1983, the San Francisco Bay Area's Metropolitan Transportation Commission (MTC) estimated that the total cost for maintaining and improving the region's transit systems through 1998 would amount to \$3.7 billion. However, MTC could identify only \$2.3 billion for that purpose, and a major portion of that money has been used to support the extension of new rail lines to outlying communities with low densities.

Design Guidelines and Model Zoning Codes

Prepare Design Guidelines and/or Model Zoning Codes that promote the Design Principles for Efficient Suburban Activity Centers. Encourage local planning agencies to incorporate them into Comprehensive Plans and Zoning Codes.

Metropolitan Planning Organizations and Transit Agencies can help accelerate the development of efficient Activity Centers by providing local planning agencies tools that illustrate how broad design principles can be implemented at a site-specific level. Instead of asking local agencies to second guess the wishes of the regional body, design guidelines, and/or model zoning codes show the way without taking away local control.

Design Guidelines for Efficient Activity Centers should illustrate how existing Activity Centers in a specific region could be retrofit to improve walkability, density, mix of uses, transit service, and parking. Where appropriate, guidelines should also identify design policies for new Activity Centers. Since many readers may be new to these concepts, descriptions, examples, and justifications should be provided to the greatest extent possible.

Model Zoning Codes can also be effective in promoting efficient design in Activity Centers, particularly in regions where local agencies do not have a strong history of requiring pedestrian-oriented design in private developments. Model Zoning Codes should be advisory documents that are then tailored by the local agency to address site-specific considerations.

Design Guidelines and Model Zoning Codes for Efficient Activity Centers.

In the late 1980s and 1990s, many regional agencies throughout the country took on the job of promoting "transit-oriented development." Example communities in the west include: San Diego, Sacramento, and Merced, California; Portland, Oregon; and Snohomish County, Washington. They prepared and distributed a number of guidebooks that explained basic concepts of trip-making, land use planning, and pedestrian-oriented design. Some agencies went on to distribute Model Zoning Codes that could be used by local agencies as templates for their own revised codes in areas around transit stations. The result is a number of exemplary developments adjacent to rail and bus transit stations and a new sense of progress and leadership in these regions. The same approach could be used to create a constituency for more efficient Activity Centers.

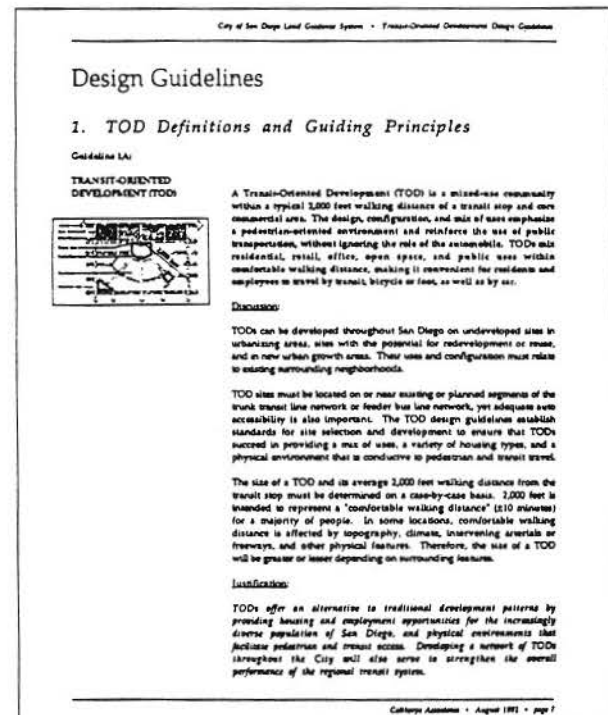


Figure 48: Sample from the City of San Diego Transit-Oriented Development Design Guidelines, Calthorpe Associates 1992.

Urban Growth Boundaries

Establish Urban Growth Boundaries (UGBs) around metropolitan areas to encourage infill, direct moderate and high density development into transit-served Activity Centers, and protect environmentally-sensitive lands.

Without clear, defensible limits to growth, investments in infrastructure and jobs will continue to decant further from city centers and into rural lands. Freeway congestion, air quality problems, and disinvestment in existing communities are amplified by an ever-expanding metropolitan boundary. It has been demonstrated that sprawl leads to higher costs in housing and infrastructure, more congestion, longer commutes, and loss of valued open space. These fundamental losses in a region's quality of life can lead to the loss of jobs within a region as employers relocate to areas with more affordable workforces and higher employee satisfaction.

Urban Growth Boundaries (UGBs) are one device for limiting urban sprawl and promoting compact development. They are a tool for protecting significant natural and agricultural resources, as well as shaping a region so that its form is more efficient and livable. Typically, UGBs are created with State enabling legislation, cut across multiple jurisdictions, and are enforced by a regional governing body. Joint powers agreements between local jurisdictions can sometimes substitute for a State-mandated UGB and regional authority, but demand a high degree of consensus among jurisdictions.

Oregon's UGB Experience

Oregon's State enabling legislation requires the establishment of UGBs around major urbanized areas. Regional governing bodies maintain the boundary and determine when and where boundary adjustments should be made. They also have the power to require local jurisdictions to adopt land use and transportation measures that ensure a good "fit" between regional pressures for growth and opportunities to accommodate it. Numerous studies by both conservation activists and development advocates have shown no appreciable increase in home prices, nor a loss of jobs, due to the UGB.

Regional Tax Sharing

Use regional tax sharing to minimize competition among jurisdictions for commercial development, reduce pressures to annex and serve outlying lands, and permit land use decisions and tax expenditures based on regional priorities.

With reduced Federal and State funding for many public improvements, local jurisdictions rely increasingly on “fiscal zoning” – or making land use decisions based on how they effect a city or county’s tax base. Typically, fiscal zoning has led local governments to favor commercial uses that yield taxes, over residential uses that consume taxes for services. As a consequence, regional patterns of development can have more to do with the incentives jurisdictions can offer commercial developers, than the broad public benefits associated with achieving a coherent urban form. Furthermore, the affordable housing that is important to the region as a whole, is driven away from communities because it can be revenue negative. Another consequence resulting from anxieties over tax revenues is that communities often annex lands for development that would otherwise escape urbanization. Providing infrastructure for these lands can be costly and compete with more efficient and desirable locations, such as Activity Centers.

Regional tax sharing is a program whereby a portion of each community’s property tax revenues are pooled and reallocated on a region-wide basis to establish greater equity in revenues and remove fiscal zoning incentives. Funds are used by local jurisdictions to provide basic public services, such as schools, affordable housing, infrastructure, etc. Allocation of the shared tax revenues is typically managed by either a new regional body or an existing agency with local government representation.

Creating a tax base sharing program involves building a consensus among communities that have a stake in the overall health of a region and then developing a legislation that is enacted by the State. Often the core of a tax base sharing coalition comprises representatives of the central cities and inner suburbs. Another vital element consists of representatives from the low-tax-capacity suburbs at the edge of the region – those suburbs that are not benefiting from a regional economic boom. These “middle tier” suburbs frequently tip the balance toward passage or no-passage of regional reform legislation. Though data analysis of historic growth and economic trends, as well as efforts to demonstrate the benefits of working together, a consensus can emerge even in the most divisive environments.

The Minneapolis-St. Paul Experience.

Opposition to regional tax sharing is often based on the false premise that wealthier, outer suburbs are already subsidizing “outmoded” central cities and inner suburbs. Surprisingly, the opposite is true in many regions. Infrastructure spending in metropolitan areas often transfers money out of established areas that are well-served by existing infrastructure to outlying areas where new infrastructure and the development it must serve is dispersed. This public disinvestment of established areas has accelerated their decline while providing no incentive for more sustainable forms of new development, such as Activity Centers. This trend was recognized in Minneapolis-St. Paul and addressed through a tax sharing program administered by a regional agency with the power of the purse – the Metropolitan Council. In Minneapolis-St. Paul, forty percent of the net increase in non-residential valuations is withheld from the coffers of local jurisdictions. Instead, that money is collected at the regional level and redistributed by a formula reflecting population and regional priorities. (Reviving, Myron Orfield)

Transportation Demand Management Programs

Establish a region-wide Transportation Demand Management program that provides alternatives for both suburb-to-city and suburb-to-suburb commuters.

Transportation Demand Management (TDM) efforts undertaken by employers include:

- rideshare matching (often with the assistance of a regional rideshare service);
- guaranteed ride home (to take risk out of ridesharing);
- vanpool support programs;
- bicycle lockers and showers;
- transit pass subsidies;
- market pricing of parking;
- reserving choice parking spaces for vanpools and carpools;
- flexible work schedules; and
- in-house employee transportation coordinators.

In addition, local and regional jurisdiction have instituted a number of TDM programs, including:

- trip reduction ordinances (TRO) (monitoring and enforcing strict targets for the number of vehicle trips or VMT during peak commuter hours);
- Average vehicle occupancy ordinances (AVO) (monitoring and enforcing strict targets for vehicle occupancy rates during peak commuter hours);
- trip fee programs (fees paid by employers to cover the cost of TDM program administration);
- transportation impact fees (fees paid by developers to cover the cost of new transportation facility construction);

- strict parking management programs (including reduced parking requirements and area caps on total parking supply);
- mobility management policies (lowering level of service standards for congested intersections and roadway segments);
- HOV priority lanes at key intersections (to improve access through congested areas);
- transit service improvements (on key commute routes and at mid-day to nearby shopping destinations);
- transit pass matching funds (in combination with employer-based programs);
- transportation management associations (to facilitate employer-based programs);
- educational programs (to promote ridesharing and transit use);

Not all of these programs are appropriate in every situation. Careful analysis should be made to assess the need for a particular program, its potential impact, and the degree of local support.

A regional approach to TDM is generally the most effective. It “levels the playing field” for all employers by removing incentives to locate in remote sites that are not transit-served. Any added costs or savings to the employer will also be felt by all employers. A regional approach can also begin to address the ever-expanding suburb-to-suburb commute trends affecting growing regions throughout the country. These corridors are often congested and have few transit options. A well-designed TDM program can provide alternatives to single-occupancy commuting in these under-served corridors and act as a starting point for more extensive multi-modal system planning.

TDM success stories.

A Seattle consulting firm that relocated to Bellevue's central business district implemented a voluntary TDM program to overcome reduced parking supply and parking fees. Their in-house TDM program rewarded employees for not driving alone by subsidizing workers who use transit and carpools. Employee participation led to a dramatic reduction in the drive-alone commute mode from 89% to 55% in the first year. A major San Francisco-based corporation has even gone so far as to purchase vans and give them to employees for personal use, so long as they agree to pick-up other employees on the way to work.

Paying for parking.

In downtown Santa Monica, the City levies a tax on all private parking lots. Not only does the tax create an additional disincentive to drive, but the \$2.7 million the tax generates annually helps offset the cost of projects that enhance walking and transit.

Parking Management Programs

Establish a region-wide Parking Management Program that minimizes the amount of free or low-cost parking in City Centers and Activity Centers, and thus provides an incentive for ridesharing and transit.

Parking minimization is one of the Design Principles suggested in the previous chapter. Implementing this concept often takes a variety of forms, such as: strict parking maximums that limit the amount of parking provided by private development; parking space caps, which set an upper limit on the total number of spaces provided in an Activity Center; parking pricing programs that set parking prices higher than the cost of a transit pass and either require an employer to charge for parking or incorporate the cost of parking into the employee benefits package; "parking benefit districts" that impose a tax on private parking lots to pay for pedestrian amenities, transit facilities, and other non-auto improvements. Not all Activity Centers have strict parking minimization programs and in many communities there is not political support for such programs. However, some regions have found that a moderate approach to restricting the supply of parking has been effective.

As with TDM programs, a regional approach to constraining the supply of parking in major employment centers is the most effective and equitable method of affecting travel behavior changes. Not only does a regional parking program remove incentives for employers to choose auto-oriented locations, but a consistent set of parking policies will also provide builders the ammunition they need to obtain financing from lending institutions which often have strict criteria regarding the amount of parking that must be provided in order to receive a loan.

Community Visioning & Education

Conduct public workshops and presentations that describe the implications of sprawl, Activity Center planning principles, and the expected scale and character of development.

Government policies alone cannot affect needed change; businesses, community groups and citizens should be informed so that they will endorse Activity Centers and the land use and infrastructure actions that support them. To develop consensus, citizens must understand how sprawl affects them as individuals – how it threatens economic growth and diminishes the quality of each day through traffic congestion, air pollution, social isolation, and loss of open space. At the same time, citizens should understand how Activity Centers can help reduce traffic, reduce public infrastructure costs, foster a sense of community, and direct growth strategically. Citizens should also be informed of how proposed changes will effect the scale and character of their communities.

Scenario testing and public process in Portland, Oregon.

Before developing plans and policies to direct land use planning and transportation investments over the next 50 years, Portland's regional planning agency, Metro, undertook a major effort to evaluate scenarios for metropolitan growth. Rather than undertaking an exercise in numbers and maps, Metro conducted a series of workshops to evaluate the implications of each metropolitan scenario on local communities. Eight representative neighborhoods near planned transit stations were selected. A cross-section of local community leaders, environmentalists, and business people were then invited to test the implications of the regional scenarios on each neighborhood. Debate, compromise and creativity proved that even the neighborhoods that might shoulder the greatest change will have a great deal to gain under the scenario that supported Activity Centers – whether measured as a function of economic development, environmental protection, or community character.



Figure 49: Involve citizens in the decision-making process.

Local Planning Tools

Build Local Leadership and Vision

Identify and support local leaders that can set a vision, build consensus, and follow the process through implementation.

Setting a vision and following it through is one of the most challenging tasks for any community. The changes to Activity Centers described in this document will call for new ways of doing business and new approaches to problem-solving. Waiting for a developer to submit a plan and then reviewing it for consistency with local policies, will most likely *not* result in an exemplary Activity Center. Instead, it will take a unique blend of community vision and local leadership to take on these challenges and bring them to fruition.

One of the most effective ways of building local leadership is to involve elected officials, private development interests, and community activists in the initial planning and visioning process. Through this effort, natural leaders often emerge. These individuals typically have a important set of skills: a position of respect within the community; the ability to listen to a variety of perspectives and help shape consensus; a clear understanding of both the physical and economic issues affecting the Activity Center; and the commitment to stay with the process through implementation. Staff at a local planning agency can then work with these individuals to build broad support for an idea and to broker difficult issues. In addition, every effort should be made to support these leaders through education and technical assistance.

The Mayors Institute on City Design.

Established in 1986 by the National Endowment for the Arts, the Mayors Institute on City Design is a resource for communities to build local leaders. The purpose of the Institute is to create a place where American mayors can meet with city designers to discuss all aspects of city design – architecture, landscape architecture, historic preservation, growth planning, urban design, and development. Mayors are the focus of the Institute concept because they are uniquely situated to be powerful advocates for good design in their communities. The Institute aims to have a lasting positive influence on the livability of communities by helping mayors to identify how good design can enhance their cities.

General Plans and Comprehensive Plans

Use local General Plans and Comprehensive Plans to translate regional land use and transportation goals into local priorities. Identify appropriate locations for Activity Centers, as well as their character, scale, mix of uses, and density.

General and Comprehensive Plans are policy documents that communicate a long-term vision for growth and change within a community. They provide an important tool for coordinating land use and transportation actions at a local level and as such, should identify appropriate locations within a community for Activity Centers. They are also an opportunity to establish policies and design guidelines that require pedestrian-oriented, multi-modal patterns of development.

The role of planning departments.

It is not always understood by those . . . offended by the design qualities of new development, that city planning departments are rarely responsible for the direct design of anything. . . from building signs to parks. Since public planners may influence and regulate whatever is built but rarely design it themselves, the importance for setting a framework for legislation and influence become clear, if the public wishes to recognize and deal with urban design issues. (Excerpted from: Allan B. Jacobs, Making City Planning Work, Chicago: American Society of Planning Officials, 1978, pp. 193-93.)

Zoning

Amend zoning codes so that they support development of mixed-use walking environments in Activity Centers.

Zoning pre-designates appropriate uses and physical characteristics of development within specified geographic areas. Typically, zoning codes dictate permitted uses, the amount of building for a site's area (intensity), building setbacks and heights, and landscaping. Zoning has the advantage of stating rules in clear, measurable terms that can generally be applied as a checklist and require little discretion on the part of the reviewers.

Factors addressed by zoning affect the health of Activity Centers and surrounding neighborhoods. Unfortunately, many existing zoning codes have been developed primarily to accommodate arrival by car, and often fail to support walking or transit. Zoning can be a powerful tool for creating attractive and walkable districts. Development intensities, the way buildings address the street, the pattern of blocks and streets, and the amount of on-site parking are among the many important facets influenced by zoning.

Specific Area Plans

Prepare Specific Area Plans for Activity Centers that coordinate development across property lines and provide a detailed picture of how the entire development area meets the intent of the Activity Center design principles.

By far the most successful technique for planning sites on the scale of an Activity Center is the Specific Area Plan. Originated in California, Specific Area Plans establish a coordinated development strategy for a focused geographic area. These plans integrate land use, urban design transportation, public infrastructure, and public finance policies into a single document. Because of its site-specific nature, Specific Area Plans can set land use and urban design features of the area in detail. Specific Area Plans are also useful for coordinating the development efforts of multiple property owners, especially with regard to street alignments and urban form.

Specific Area Plans also streamline the approval process by linking together a number of actions typically sequenced in the entitlement process: zoning changes, zoning code amendments, traffic and environmental review, and approval of capital facilities planning, phasing, and financing.

Most cities that use Specific Area Plans adopt ordinances that establish content and processing standards, as well as clarify the extent of entitlements that would be granted if a Specific Plan is adopted.

Specific Plans, Activity Centers, and revitalization.

Activity Centers describe not only new concentrations of development, but also the revitalization of existing districts into major nodes with employment, housing and retail. In Santa Monica, California, the "Third Street Mall Specific Plan" established policies and strategies to revitalize downtown Santa Monica and transform it into a major regional center. Economic incentives, transportation management and design controls have transformed downtown Santa Monica into a dynamic urban village that meets the shopping needs of nearby residents, provides sizable office space for the business community, creates a range of new housing opportunities, and solidifies its place as a center of cultural activities. Public investments in streetscape enhancements and parking structures, served as effective catalysts for new private investment which has been shaped through urban design guidelines.

Density Bonuses

Offer density bonuses to encourage developers to build amenities or land uses that meet Activity Center goals but may not otherwise be built by the market.

Affordable housing, public plazas, outdoor eating areas, pedestrian connections, public art and other amenities can often be encouraged through carefully crafted Density Bonus programs. In these programs, increased levels of development are permitted when additional public amenities are provided. This system of bonuses builds in incentives for good urban design without mandating specific elements. Developers can weigh the costs and benefits of various options when preparing project proposals and pro-formas. Density Bonuses, do however, need to be sensitive to market realities. If a bonus is tied to a density that has little market demand, it is unlikely that any of the desired amenities will be provided.

Floor Area Ratio Amenity Incentive Systems.

Downtown Bellevue, Washington, has been highly successful in securing public plazas, enhanced sidewalks, and groundfloor retail space by linking these amenities to increases in allowable Floor Area Ratios. (Floor Area Ratio is the ratio between the total built floor area and area of the site it sits on.) The increases in floor area are transferable to adjacent properties. Amenities that benefit the whole CBD, such as improvements to the primary pedestrian corridor, garner density bonuses that can be transferred throughout the CBD. With criteria for amenities and intensity bonuses clearly spelled out, the program can be implemented administratively.

Transfer of Development Rights (TDR) Programs

Study the feasibility of establishing TDR programs that increase development potential within Activity Centers, while preserving valuable agricultural/open space lands.

TDRs have been used for many years as a tool for preserving agricultural lands or other valuable open space, without purchasing a parcel's development rights. TDR programs create a system of development credits that must be obtained in order for a particular parcel of land to be developed at densities that are desired by the market. Developers purchase these "credits" and in doing so, establish deed restrictions on properties that will be preserved. Both a "transfer zone" – sites where developments will be transferred from – and a "receiving zone" – sites where development credits will be transferred to – must be identified.

In theory, TDR programs could be used to focus development within a region or community into Activity Centers and to limit urban sprawl by simultaneously preserving open space. However, TDR programs present two critical challenges: setting a price for the credits that can be supported by the market (a credit cannot be priced so high that it will not be purchased) and linking up sellers and buyers (many TDR programs fall apart because transactions cannot be completed).

Multi-Modal Street Standards

Adopt street standards that encourage multi-modal use of public rights-of-way, without excluding autos.

A street fabric that is comfortable for pedestrians, bicyclists, transit, and autos is a key factor in making an Activity Center efficient. In most communities, the street design standards result in streets that encourage cars to move quickly through an area, are wide enough to act as barriers to pedestrians, and have few of the amenities that make walking and bicycling pleasant and safe. Alternatives to these standards are being developed by a number of communities throughout the country, with the express intent of slowing traffic and making the street inviting for a diversity of users.

Though each community should develop alternative street standards that are tailored to the specific needs of a particular Activity Center, typical strategies include:

- **Narrowing the street** – this reduces the speed that most drivers find reasonable and comfortable. A variety of methods can be used to reduce travel lane widths and narrow street crossings.
- **Sharing the pavement** – street designs that expressly include on-street parking, transit lanes or stops, and bicyclists also help slow traffic to speeds that are safe for pedestrians, without compromising safety.
- **Deflecting the vehicle path** – routing a street around a public park or plaza also helps “tame” traffic, while maintaining permeability.
- **Changing the pavement surface** – special pavers or textures demand attention from drivers and thus reduce speeds.

Alternative Parking Standards

Reduced minimum parking standards should be applied to Activity Centers in recognition of their proximity to high frequency transit service, their walkable environment, and mix of uses.

Limited, rather than ample, parking supplies encourage commuter use of transit service. Minimum requirements help to avoid “spillover” parking in retail areas or nearby neighborhoods; maximums guard against overly generous parking supplies that discourage transit use and contribute to construction of large surface parking lots.

The complementary relationship between land uses in a mixed-use area encourages multipurpose trips. Thus, a single parking space can serve several land uses. Additionally, peak parking demand for different land uses is often generated at different times during the day, week, or season. This also allows joint use of the same parking space for several uses. Projects with a mix of uses should seek to reduce the total number of parking spaces by comparing peak demand of each use by time of day, day of the week, and season. Where the varied parking demand for proximate uses allows joint use of a single parking facility, reducing the number of spaces is strongly encouraged. In addition, on-street parking should also be used to fulfill a portion of the total parking requirement for a mixed-use project.

See also “Regional Regulatory and Advisory Efforts.”

Design Review

Use design review to ensure implementation of Activity Center design principles, to give clear direction to developers, and to achieve an appropriate quality of development.

Design review is often undertaken by a qualified board of designers and planners who have been appointed by a city council or other governmental body. Design review can augment standard zoning to address complex design issues that are difficult to distill into measurable standards. While having some discretion, design review boards should be directed by a clear set of design principles or guidelines. These principles or guidelines should include statements of goals and unambiguous language on how to achieve them. When properly crafted, design principles or guidelines can save private developers time and money by reducing the uncertainty and time it takes to get through the project approval process.

Redevelopment Authority

Consider using redevelopment authorities to encourage development of an Activity Center on an infill site or to facilitate the retrofit of an existing Activity Center.

A redevelopment authority can be an important tool for converting underutilized lands into an Activity Center and encouraging new land uses that support Activity Centers. Redevelopment districts allow tax increments to be earmarked for redevelopment-related projects, such as transit improvements, pedestrian enhancements, and structured parking. Strategically located parcels can also be condemned and reassembled by using local redevelopment authority.

Healing existing developed communities using redevelopment.

In Ontario, California, a redevelopment district was created to help convert a strip commercial area plagued by crime into an Activity Center. In addition to employment uses, the Activity Center will include retail and entertainment services that will serve the surrounding residential neighborhoods and provide the kind of pedestrian-oriented environment that will make the area a desirable place to work and live. Redevelopment authority was used to fund critical master planning efforts and pay for streetscape enhancements for a new retail "main street." Redevelopment authority was also used to acquire a strategic parcel and attract developers who would construct pedestrian-oriented projects.

Capital Improvement Budget Priorities

Consider Activity Centers as top priority locations for public capital improvement budget expenditures. Use Capital Improvement Program funds for improvements that support efficient Activity Centers, such as streetscape enhancements, pedestrian linkages, and civic facilities like day care, libraries, and transit stations.

Public infrastructure can be used as catalysts for private development. Infrastructure's role as a catalyst for private investment goes beyond roads and sewers. Streetscape enhancements, civic plazas, and transit station improvements are increasingly used as ways to make places that businesses want to be and as evidence of a City's commitment to an area.

Capital Improvement Programs (CIPs) allocate public funds for new or expanded facilities, such as streets and sewers. When you read between the lines, CIPs are a statement of community priorities. Without the means for implementation, principles for creating effective Activity Centers are merely words. The power of the purse should pay for public projects that encourage the formation and on-going viability of Activity Centers, both directly and indirectly.

Congestion Management and CIPs

The design of public infrastructure can also include site-specific measures for congestion management. Bellevue, Washington, and other communities have constructed HOV lanes at severely congested intersections to allow transit and carpools to bypass costly delays. Many cities have also introduced computerized signalization and transit vehicle detection devices to coordinate traffic signals and enhance transit reliability. These improvements are part of the CIP.

Local Shuttle Systems

Establish local shuttle buses to "compress" the distance between Activity Center destinations and to connect Activity Centers to region-serving rapid transit.

Many existing Activity Centers are not linked to a regional transit system and/or have been designed in the era where single-use, auto-oriented patterns were used. A local shuttle system can be very effective in these settings to bridge the distance between destinations and provide a convenient connection to a regional transit station.

Local shuttle systems can be sponsored by a variety of entities, including: a single employer or group of employers within a district, a tenants/merchants association, an educational institution, the transit district, or a local government. In any case, it is important that headways are frequent at all times of the day that employees need to travel, including morning, lunchtime, and evening.

Connecting Activity Centers to the region.

In Cambridge, Massachusetts, the Cambridge Gallery, a new regional shopping mall in the Kendall Square area, completely funds and operates a free shuttle running to nearby subway stations. The shuttle runs every 15 minutes on weekdays, with abbreviated schedules evenings and weekends. Annual ridership has skyrocketed since the implementation of the service from about 300,000 persons the first year to nearly 800,000 at the end of the third.

Lessons learned from downtown revitalization.

In the last decade, downtowns have flourished in Santa Barbara, California, and Chattanooga, Tennessee. Part of their success can be attributed to electric shuttle buses that whisk shoppers, tourists, and business people to destinations that would otherwise be a long walk away. The shuttles offer frequent service (every five minutes), cheap fares (25 cents or free), zero emissions, courteous service, and a fun image. The shuttle system is also supported by convenient public parking garages at the edge of their pedestrian-oriented cores. While electric buses are more expensive to purchase than their diesel counterparts, the Santa Barbara Transit District estimates that its electric shuttle buses cost 2 cents per kilometer (3.2 cents per mile) to operate, versus 9 cents per kilometer (14.5 cents per mile) for comparable diesel buses. Electric buses are also estimated to remain in service for eight years, versus five years for diesel versions.

Transportation Demand Management Programs

TDM programs can be instituted on either a local or regional level. See "Regional Regulatory and Advisory Efforts" for a description of these programs and their application.

Chapter 7: Case Studies

Introduction

This section looks at six sites that have been considered “exemplary models” of efficient SACs. The characteristics of these places, how they function in terms of travel behavior, and the factors that influenced their successes are summarized. The six case studies purposely represent a variety of conditions – infill and new growth, urban settings and suburban conditions – so that users of this document can find examples that are relevant to their situation.

Selection of Case Study Sites

Over 30 SACs were initially reviewed to determine their suitability for further study. Factors such as location (within the U.S. as well as abroad), size, transit service, mix of land uses, street system, pedestrian/bicycle orientation, transportation demand management systems, and availability of data were compiled and weighed. The six sites presented here represent those that, as a group, illustrate a variety of conditions, trends, and problem-solving approaches. Table 1 summarizes the characteristics and approaches used at each of the sites.

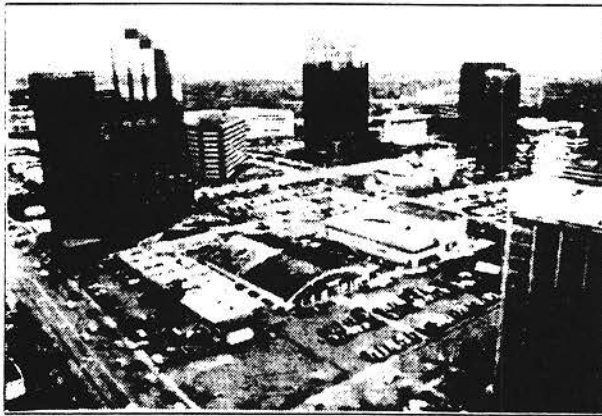
Table 1 • FHWA: Design for Efficient Suburban Activity Centers • Summary of Exemplary SACs

	Exemplary Sites	Location	Street System	Transit Service	Urban Design	Land Use	Parking	TDM	Mode Split
1	Downtown Bellevue, WA	Suburban Center	Interconnected grid. Wide streets and large blocks	Bus Only. Local and regional Transit Transfer Center	Buildings orient to streets Pedestrian amenities provided via density bonuses. Surface parking lots make incomplete urban fabric.	Mixed-Use - mostly office and retail, some housing	Min. and max. parking stds. No shared pkg. Pricing tied to bus pass cost.	Local TMA. Site-based trip reduction Plan. "One Less Car" program	<i>Employees:</i> 76% SOV 13% Car/Vanpool 8% Transit <i>Residents:</i> 64% SOV 25% Car/Vanpool 8% Walk/Bike
2	Pleasant Hill BART Station, Pleasant Hill, CA	Suburban Center	Superblocks around BART station.	Rail and Bus BART station is at center of site	Auto-oriented. BART parking separates transit station from development. Monument buildings.	Mix of office and residential. Very little retail. Daycare	BART parking garage plus surface lots. Standard parking ratios for private uses.	Local TMA. Vanpool ridematch. Guaranteed ride home.	<i>Employees:</i> 67% SOV 15% Car/Vanpool 10% Transit 2% Walk/Bike
3	Downtown Santa Monica, CA	Urban Center	Fine-grain interconnected street fabric. Third St. is closed to auto traffic	Bus & Shuttles. Local bus system Shuttle links satellite parking lots and major destinations	Excellent pedestrian/bike environment. Bridges over freeway link Civic Center w/ retail. Building orient to streets & have contextual design.	Mixed-Use - office, retail, entertainment, civic, housing.	6 city-owned parking garages. No new parking required for renovated buildings.	Trip reduction ordinance. Transportation impact fee. City-wide TMA.	<i>Employees:</i> 60% SOV 28% Car/Vanpool 10% Transit 2% Walk. <i>Residents:</i> 18% Walk/Bike
4	South Coast Metro, Costa Mesa, CA	Peripheral Center	Superblocks. Wide arterials and no secondary streets	Bus and Shuttles	Auto-oriented. Few pedestrian-friendly areas. Monument buildings.	Mixed-Use - office, regional retail, cultural, entertainment, some housing	Excess supply. Shared parking provisions.	Trip fee prog. Air quality regulations. TDM ordinance	<i>Employees:</i> 75% SOV 19% Carpool 3% Transit 2% Walk/Bike
5	Kendall Square, Cambridge, MA	Urban Center	Superblock system is in a larger fabric of interconnected streets	Rail, Bus & Shuttle. Multi-modal transit station is focus of core area.	Pedestrian scale and amenities at transit hub.	Office and retail - no housing. Near MIT and retail/housing. Senior/child day care.	Area-wide parking supply cap. No on-street parking in core area.	City-wide Trip reduction ordinance. Developer-sponsored TDM programs.	<i>Employees:</i> 58% SOV 40% Transit 1.5% Walk/Bike <i>Residents:</i> 35% SOV 36% Transit / Carpool 28% Walk/Bike
6	Downtown Bethesda, MD	Suburban Center	Interconnected grid & radial streets. Dev. Permits tied to traffic impacts	Rail and Bus. Multi-modal transit station is focus of core area.	Pedestrian scale. Buildings orient to streets. Pedestrian amenities provided by "Beauty Contest"	Mixed-Use - office, retail, residential. Strong retail and entertainment focus.	Strict limits on parking supply. Parking pricing.		<i>Employees:</i> 74% SOV 24% Transit/Carpool 2% Walk/Bike <i>Residents:</i> 48% SOV 16% Walk/Bike 32% Transit/Carpool

Case Study #1: Downtown Bellevue, Washington

Introduction

Bellevue's success in achieving higher transit use and pedestrian activity demonstrates the Pacific Northwest pioneering and entrepreneurial spirit operating at the scale of a growing suburban city. Both public and private sector actions in the City of Bellevue's Central Business District contribute to an increasingly vital pedestrian environment in the downtown and a shift from commuting in single occupancy automobiles to other modes of travel, including walking, bicycling, and transit. This case study highlights the decisions and actions contributing to this success, and considers some of the problems and limits of adopted policies and actions.



Site Description

Downtown Bellevue, once a small suburban community, is today the third largest activity center in the Seattle region after downtown Seattle and Tacoma. With over 435,000 square meters (4.7 million square feet) of Class A office space and an additional 390,000 square meters (4.2 million square feet) of commercial and mixed-use development, downtown Bellevue

has gained recognition as a significant force in the region's economy. The town's core area focuses on a regional shopping center, Bellevue Square, as well as an emerging high density housing component. This mixed-use pattern, along with a comprehensive set of planning and management tools specifically designed to reduce reliance on automobiles, has given Bellevue the recognition as an exemplary Suburban Activity Center.

Bellevue's ability to become a major Suburban Activity Center within the Seattle region, as well as its success in changing travel behavior is, in part, due to its unique locational advantages. Bellevue is located at the center of King County, on the east side of Lake Washington, 19 kilometers (12 miles) from Seattle. It is at the crossroads of I-405, a major north-south Interstate freeway, and I-90 and Highway 520, two major east-west freeways that provide direct connections to downtown Seattle. The site's raised topography slopes to Lake Washington, affording views to Seattle and the Olympic Range to the west, and rises above Lake Sammamish, to provide views of the Cascade mountains to the east. Both the freeway linkages and the natural amenities made Bellevue ideally situated to capture regional growth.

Bellevue first became a regional destination in 1946 with the development of one of the first shopping malls in the country, Bellevue Square. Today, Bellevue Square is an internationally recognized, up-scale 121,000 square meters (1.3 million square foot) regional shopping center

and major attraction to the downtown. In the 1980s, King County and the Seattle metropolitan region underwent phenomenal employment growth. Bellevue was able to capture a significant proportion of this growth, doubling employment by adding over 12,000 employees to downtown (now a total of over 24,500 jobs). With the growth in employment came an increased demand for housing, which the surrounding Bellevue area provided. Proximity of housing near downtown Bellevue enhanced the attractiveness of the Central Business District (CBD) for employment and retail development.

Bellevue's CBD is served by the regional transit authority METRO with over 20 local and regional fixed bus routes. Route consist of local, inter-community, and express connections to Seattle and a network of park-and-ride lots. The focus of the CBD transit service is a timed transfer transit center located in the office core area. The majority of the routes offer frequent all day bi-directional service, but several routes are offered only in the peak commute period.

Travel Behavior

An analysis of travel behavior shows shifts toward ridesharing and transit ridership since plans were put in place to encourage downtown Bellevue to become a mixed-use, transit-oriented Suburban Activity Center. Bellevue's comprehensive transit system, parking pricing program, and emphasis on pedestrian-oriented urban design have been effective in also increased trip linking within the CBD and an overall reduction in auto trips.

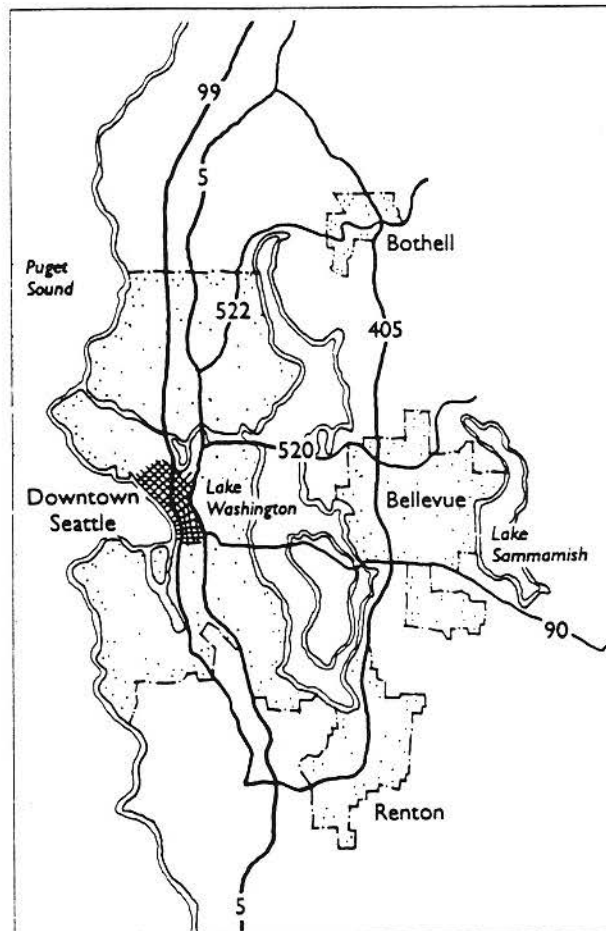


Figure 50: Bellevue is a suburb of Seattle, located at the juncture of several important freeway connections.

Commute Mode Split

Table 2 compares the commute mode split for workers and residents in Bellevue's central business district in the early 1980s to a decade later.

Changes Over the Past Decade

The commute mode split of all CBD office workers has remained constant over the past 10 years. The Bellevue transit center, restructured bus routes, and parking constraint policies were in place when the 1984 data was collected

indicating these improvements and measures took effect early and have changed little.

Residents who commute from the CBD drove alone more and carpooled less in 1990 than a decade ago. Transit use, though, has increased. Census data shows an increase in the number of CBD residents who commuted out of Bellevue between 1980 and 1990. Commuters to Seattle, for example, increased 11%. Commutes to suburban areas outside of Bellevue that are not well-served by transit may have contributed to the increased use in single occupant vehicles.

Present Commute Modes

Office workers in large buildings use transit and rideshare more than workers in smaller buildings and workers in consumer services (restaurant, hotel) and retail businesses. On average, employees of companies with 900 or

more jobs used transit or carpooled twice as much as employees of smaller companies. This may be due to the fact that major employers provide incentives for HOV travel, including rideshare matching, subsidized bus passes, preferential parking, and reduced parking fees for carpool/vanpool vehicles. Smaller businesses provide fewer, in any, of these incentives. In addition, large businesses have limited and expensive parking for tenants, while employees of smaller buildings and retail businesses often park for free.

Office and consumer service workers use transit and rideshare more than retail workers. Most retail businesses have fewer than 100 employees and are not required to offer HOV incentives and generally provide free parking for employees. Retail employees often work irregular shifts and can avoid peak street congestion or cannot coordinate work times

Table 2
Comparative Mode Splits
Downtown Bellevue

Travel Mode	Prior to Redevelopment (1)		After Redevelopment							
	Dtm. Bellevue Residents	Region Residents	Downtown Bellevue						Region	
			Employees (2)					Residents (3)	Residents (3)	
			< 100 empl.	Office 100-899 empl.	900 + empl.	Consumer Services	Retail			TOTAL
Drive Alone	58.4%	63.9%	86.2%	83.1%	72.4%	77.4%	87.4%	80.6%	64.5%	72.8%
Carpool/Vanpool	15.3%	18.2%	6.9%	10.1%	13.5%	8.5%	6.0%	9.7%	12.5%	11.6%
Transit	12.4%	9.6%	5.0%	5.7%	10.7%	9.4%	5.0%	7.4%	12.5%	7.3%
Walk	13.9%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	3.3%
Bike	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.3%	0.6%
Motorcycle	-	-	-	-	-	-	-	-	0.0%	0.4%
Worked at home	0.0%	2.0%	-	-	-	-	-	-	2.3%	3.4%
Other	0.0%	2.1%	1.9%	1.1%	3.4%	4.7%	1.6%	2.3%	0.0%	0.6%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sources:

- (1) 1980 Journey-to-Work Census data.
- (2) 1990 Bellevue CBD Transportation Mode Use Study, The Gilmore Research Group, January 1991.
- (3) 1990 Journey-to-Work Census data.

with transit schedules. These factors result in faster and less expensive commutes for employees who drive.

Residents of the CBD use alternatives to driving alone more than workers commuting into the CBD. About 35% of the employed CBD residents work in the CBD, with nearly half walking or using transit to the workplace. About 14% of residents' non-commute trips internal to the CBD are made by walking. Compared to the metropolitan area, residents of the Bellevue CBD drive alone less and use transit nearly twice as much.

Bellevue's density, mixed-use, proximity to transit, pedestrian pathway system, and parking costs encourage residents to walk within the CBD. The proximity of regional transit to the commute trip origin is an important factor in resident's choice to use transit.

Trip Internalization

Over half (55%) of the CBD employees make midday trips with nearly 30% of those trips internal to the Bellevue CBD.

Automobile Trip Generation

The key findings of automobile trip generation surveys in Bellevue's CBD are:

- The majority of office buildings in the CBD generate between 2% to 60% fewer peak hour automobile trips than the national average, as reflected in the Institute of Transportation Engineers Trip Generation manual. On average, morning auto occupancy is 1.20 ranging from a low of 1.04 to a high of 1.74 persons per vehicle.
- Retail centers in Bellevue have peak hour automobile trip rates equivalent to or higher than national average trip generation rates. Nearly 30% of the auto trips generated by

Growth Comparison 1970-1988

Population, Vehicles, and Person Trips

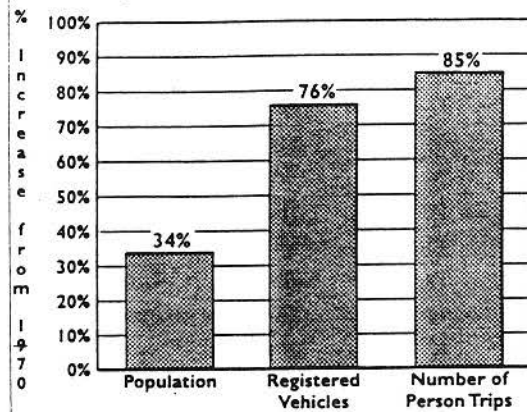


Figure 51: Growth Comparison for Downtown Bellevue 1970-1988

the regional shopping center, Bellevue Square, are internal to the CBD with over half of these trips linked to other retail sites in the CBD. Average afternoon auto occupancies at retail sites are 1.17 persons per vehicle. The pass-by rate (trips drawn from traffic already passing by on an adjacent street) for Bellevue Square is 27% in the afternoon peak hour, comparing favorably to the national standard of 23% for a 93,000 square meter (1 million square foot) shopping center.

- Residential sites in Bellevue's CBD generate about 5% fewer peak hour auto trips than the national average for similar types of housing. Average morning auto occupancy of residential sites is 1.18 ranging from 1.11 to 1.26 persons per vehicle.

Keys to Success

Bellevue's success is a story of political will and entrepreneurial spirit, realizing economic opportunities and overcoming limits set by poor infrastructure decisions in the 1950s.

Effective Public Will

The public's decision to concentrate office and retail development in Bellevue's Central Business District grew out of an effort to defeat a proposed competing regional shopping mall that stood to challenge the financial health of the downtown's retail core.

In the late 1970s, the proposed development of a regional retail shopping mall outside the downtown core, Evergreen East, threatened the financial stability and growth of Bellevue Square, the major downtown Bellevue regional shopping center. At the same time, downtown property owners and the Bellevue City Council sponsored a market research study which found that the downtown was in "trouble" and that it was not in a position to take advantage of the 93,000 square meter (1,000,000 square feet) of projected office employment to be developed in the region over the 1980s. These concerns, along with fears of the adverse environmental impacts from continued commercial sprawl, led to the organization of the Downtown Bellevue Association and its cooperation with the City. The Association, the City, and other public interest groups organized a coordinated effort to oppose Evergreen East and redirect that growth into Downtown Bellevue.

Ultimately, the Evergreen East development proposal was defeated and a public decision and commitment was made to support and encourage the Bellevue Central Business District

as the financial and business hub of the community. A public planning process was embarked upon to develop new public policies that concentrated development in a core area of the CBD and facilitated public transit and pedestrian circulation as the primary modes of travel. These policies were put forth in the "CBD Subarea Plan."

Working to Create a Pedestrian Vision for the Downtown

The CBD Subarea Plan described a powerful vision for the downtown Central Business District: "be the financial and business hub of the community and develop intensively into an urban center." In order to realize this vision, public transit and pedestrian circulation were prioritized as the primary modes of travel. However, increasing development capacity and shifting commuting out of single occupant vehicles required three simultaneous actions:

- designing market incentives to encourage development in the CBD;
- providing higher levels of transit service to diversify commuting options; and
- developing incentives to encourage transit use.

The CBD Subarea Plan consists of a land use map, goals, policies, programs, and implementation mechanisms that together map a strategy for realizing the community's vision. Key policies of the plan are:

1. Locate regional shopping and major retail department stores in the CBD to create a retail focus.
2. Locate major office development in the CBD in order to complement retail activities and facilitate public transportation.
3. Encourage high density housing within and surrounding the CBD.

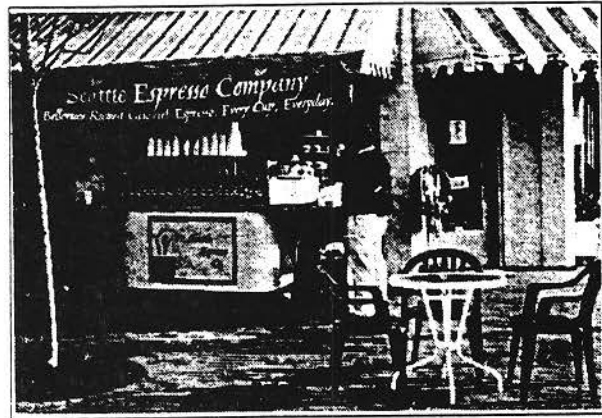
4. Provide density bonuses for private developments to accomplish public objectives suggested by the CBD policies and guidelines.
5. Require design review to ensure high quality development in the CBD.
6. Establish minimum and maximum parking requirements and encourage multiple businesses to share parking.
7. Provide employee parking outside the CBD core area in order to intercept CBD-bound trips and provide pedestrian and transit linkages to the core area.

Ironically, the traffic capacity limits of the 1950s street system led Bellevue to choose a pedestrian- and transit-oriented future to accommodate the projected commuting demands on the CBD street network. In the 1950s, during the post-World War II boom, Public Works Director Fred Herman designed a superblock street and block pattern for downtown. He envisioned a two-story street system servicing 183 meter (600 foot) long city blocks. By the late 1970s it was clear that Bellevue's superblock infrastructure did not have the street and right-of-way capacity to accommodate the projected levels of office and retail employment desired to make the CBD an urban center. For Bellevue to develop into an urban employment and retail center, it was imperative to encourage alternatives to commuting in single occupant vehicles. This realization led to the development of a transit- and pedestrian-oriented downtown.

Establishing Incentives for Pedestrian-Oriented Urban Design

Bellevue's CBD offered high quality, Class A office space that drew tenants from both Seattle and California. It created a positive image that countered the negatives of downtown Seattle – increasing congestion and lack of quality

housing near downtown. Bellevue's regional retail amenities were also a significant and growing attraction. But in order to create a truly mixed-use, pedestrian-oriented environment, the City needed to provide additional incentives for developers to build outdoor public amenities. Thus, the Land Use Code was prepared.



The Land Use Code offered Floor Area Ratio (FAR) density bonuses to entice developers to build with pedestrians in mind. The key aspect to Bellevue's Land Use Code is the Floor Area Ratio Amenity Incentive System. This system gives height and density bonuses to developers that provide a range of amenities which enhance the character of the downtown. The system has the following basic features:

1. Standards for providing public benefit amenities that encourage pedestrian activity, increase transit use, and improve the quality of the physical environment downtown, such as public plazas, enhanced sidewalks, and ground floor retail space.
2. The amenities are linked to increases in allowable development floor area. For example, for every 3/4 meter (eight square feet) of public plaza, a bonus increase of 929 square centimeters (one square foot) of floor area is allowed.

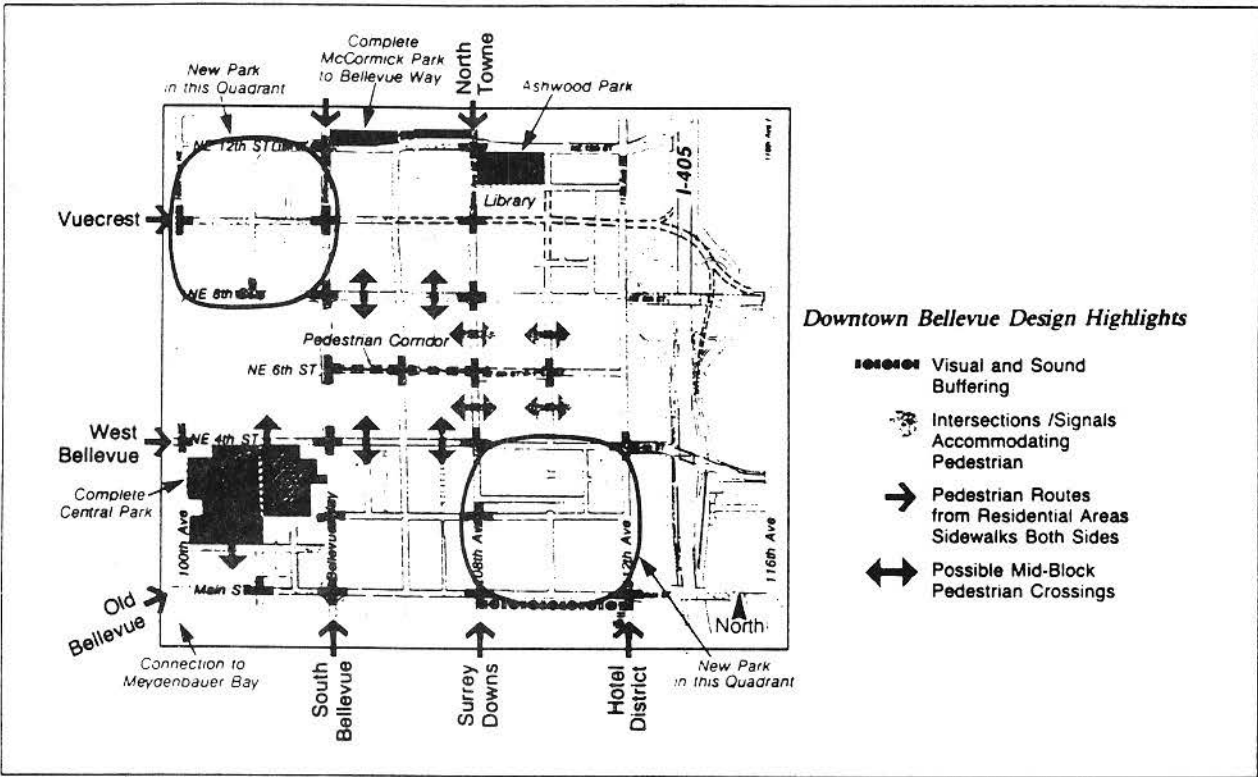


Figure 52: The CBD Subarea Plan illustrates the key urban design components of the revitalization effort.

3. The increases in floor area are transferable to adjacent properties, and in the case of improvements to the major pedestrian corridor, increases in floor area can be transferred throughout the CBD core district.
4. Administrative review of the incentive system by the Director of Design and Development allows the granting of bonuses if the design criteria for the amenity are met and the director finds that a public benefit will be derived from the development of the proposed amenity in the proposed location. This limited process assures developers that applications will be reviewed in a timely manner.

Creating an Early Transit Presence in the CBD

The first public step in the implementation of the plan was for the City of Bellevue to link transportation and land use planning. A

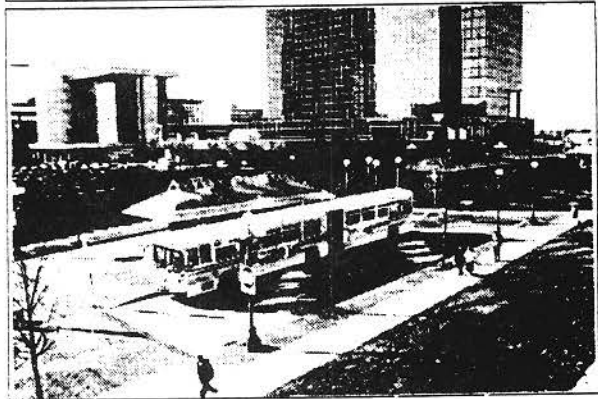
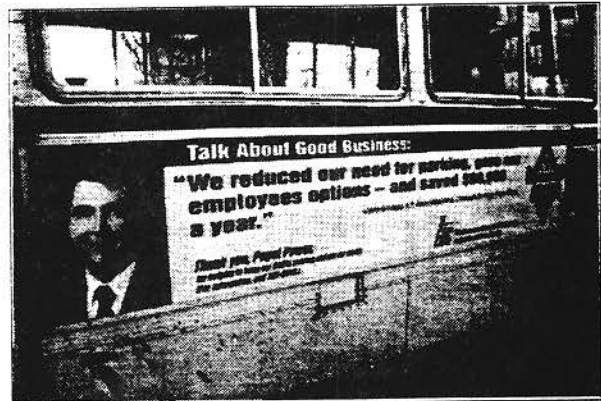
pedestrian circulation corridor was defined that built on the marketing strategies used by shopping mall developers. "Major anchor tenants" were defined for both ends of the pedestrian corridor – Bellevue Square was defined as the western anchor and a transit center was constructed to serve as the eastern anchor. By donating a public right-of-way to the regional transit authority, Metro, and building a timed transfer bus station in the heart of the CBD, the City created visible and available commuting options for new employers considering locating downtown. The development of the Transit Center also created a first phase symbol and focal point for the future development of the CBD.

At the same time that the City developed the Transit Center, Metro restructured the regional transit routes from a suburb-to-Seattle network to a network where Bellevue is a timed transfer point. Today, Bellevue is a hub for over 20 inter-suburban and central city fixed bus routes. The majority of the routes offer all day service, but several routes are offered only in the peak commute period. This strategy increased regional access and service to Bellevue. It also led to an increase in the level of transit service to the CBD. The effect of the restructuring was an increase in the transit mode split from 2% to 8%, and it has since climbed to about 10%.

These initial capital and service improvements ushered in a new era of increased transit service and ridership for the City of Bellevue and the King County region. Over the last ten years there has been a steady increase in transit service accompanying local and regional growth. Today regional transit service includes a network of bus transit expressways and HOV lanes.

The future of transit service in Bellevue's CBD is addressed in the City's mobility management objectives and with plans for a regional rail system. Specifically:

- Bellevue has established a "mobility target" for transit service in the downtown that will be measured in terms of area coverage and frequency, and in terms of mode split. Achieving the mode split targets for non-SOV travel (30% by 1999 and 40% by 2005) are expected through a combination of transit improvements and TDM programs.
- A proposed three county high capacity light rail system went to the voters in November 1996 and was approved. Bellevue will participate by reserving rights-of-way, locating stations, integrating pedestrian and bicycle facilities in the transit corridor and promoting transit-supportive land use patterns within the rail alignment.



The cooperative working relationship between Metro and Bellevue demonstrates the benefits both local and regional agencies can achieve once common goals are recognized. It is an example of an entrepreneurial city negotiating for better transit service and a regional transit agency seeking long-term commitment from the community to provide ridership. Bellevue's attitude was that it was Metro's job to provide service to Bellevue, and that Metro should restructure its routes to better address actual suburban commute patterns. Metro's response was that it was willing to play if there were ridership benefits. Metro stipulated that the City build the Transit Center and, in order to realistically increase ridership, that it charge for parking throughout the CBD.

Setting Strict Parking Management Policies

Beginning in 1981, as part of its overall downtown revitalization scheme and as a condition Metro set for providing increased and restructured transit service, the City embarked on a parking supply management program. This program significantly lowered the minimum number of off-street parking spaces required of developers of new office space. For buildings under 9,300 square meters (s.m.) (100,000 square feet (s.f.)), the parking ratio was reduced from 5.0 spaces per 93 s.m. (1,000 s.f.) to 2.2 per 93 s.m. (1,000 s.f.). For buildings over 93 s.m. (100,000 s.f.), the parking ratio was lowered from 3.3 to 2.2 as well. A new maximum was set for both categories of 3.3 spaces per 93 s.m. (1,000 s.f.), which has been lowered over time to 2.7 per 956 s.m. (1,000 s.f.). By constraining the supply of office parking, the City's parking management program has acted as a catalyst to encourage alternate mode use. Today, utilization of the downtown area's nearly 25,000 parking spaces is, on average, about 40% to 60%.

Bellevue had two ends in mind with the minimum and maximum parking requirements: encourage development and reduce commuter parking impacts and congestion downtown. These goals are a result of the fact that the CBD's superblock pattern did not have the street and right-of-way capacity to accommodate the projected levels of office and retail employment.

For the downtown property owners and speculative commercial developers, the reduced parking requirements provided the incentive necessary to locate and develop speculative office buildings downtown. Downtown speculative office developers and land owners benefited from the low parking minimums

because actual development costs were reduced. This incentive, along with other locational advantages, helped to shift regional office development growth to the Bellevue's CBD. The success of this measure was dependent on developers accepting the risk that new office tenants would see that the overall merits of locating in the CBD would offset the burden placed on employees to use alternatives to commuting to work in single occupant vehicles. It worked. Employers chose to locate in Downtown, accepting the requirements to shift commuting into carpools and transit.

Key to the success of the reduced parking supply program was the pricing of office and other non-retail parking. Metro required that the price of parking not be set any less than a two zone bus pass. The idea was to charge commuters for parking, yet let shoppers park free. Employers could then create incentives to use transit by providing transit passes, providing free parking for carpools, or charging employees for parking.

Parking charges have significantly increased over time. When this parking strategy was introduced, most parking was free surface parking. In 1979, the average price for commuter parking was \$2.00/stall/day. By 1986-87, the average price had increased to \$20/stall/day with building tenants paying monthly fees ranging from \$25 to \$65 per single occupant vehicle. In the 1986-1991 period there was little change in the price of commuter parking. In an effort to "level the playing field" the statewide Growth Management Act establishes consistent parking fees and limitations countywide so that communities will not compete for development based on parking supply and cost.

Bellevue does not place any restrictions on retail parking which is abundant and free. While the majority of parking in the CBD is structured parking, there are many small surface lots serving stand-alone retail and service businesses. These lots are strictly monitored to reserve spaces for customers. The effect of the monitoring is a constant shuffling between lots for customers making multi-purpose trips to the downtown. This effect is noticeable in the midday peak period which experiences the highest congestion of the day.

For a time, spill over parking into neighborhoods surrounding the CBD became a problem when retail employees, restricted from customer lots, searched for free on-street parking. Bellevue then implemented a successful residential permit parking program in the impacted neighborhoods.

Establishing a Public & Private Transportation Demand Management Program

The City of Bellevue has been involved in Transportation Demand Management (TDM) efforts since the early 1970s, when increasing traffic congestion levels in its downtown core and successive Mideast oil embargoes raised alarms about automobile use and energy consumption. The advent of more stringent federal clean air regulations in the early 1990s has found Bellevue already expanding its TDM efforts to meet new challenges.

Parking Management

As described above, the City's parking supply management program involves minimum and maximum parking ratios for new office development in the CBD. It also sets minimum prices for all off-street non-retail parking.

Mobility Management

Recognizing that it is not feasible to continue to widen roads to accommodate ever increasing traffic, Bellevue stopped attempting to mitigate peak hour congestion at every intersection and changed their approach to measure congestion on an area-wide basis. This approach allows more congestion in the CBD in return for a stronger emphasis on transit, walking, and other alternatives to SOVs. More congestion is also allowed when wider streets are judged to be worse than the congestion they are designed to solve, such as creating a barrier for pedestrians.

Transit Fare Discounts through Metro FlexPass

In cooperation with the regional transit agency, Metro, the City has provided discounts for downtown transit users since 1993. This program is currently budgeted at roughly \$100,000 per year in matching funds for employers who are under contract with Metro to purchase and vend transit passes on-site.

Transportation Management Association: TransManage (formerly Bellevue TMA)

Beginning in 1986, TransManage has been providing employer-based TDM plan information and support to its member businesses. Its nine major clients represent over 9,000 workers in the downtown Bellevue area, including PACCAR, Puget Power, and US West.

Non-Work Trip Education Program: "One Less Car"

This program was established in 1994 and attempts to address non-work related travel through education and outreach. A transit-oriented "Use It Wisely" program has recently

been added to the program mix. The goals of the new program will be to promote the use of transit by streamlining the rider/system interface. The City has increased its budget to \$200,000 per year for the joint campaign.

HOV Priority Lanes at Key Intersections

Newly constructed HOV lanes at congested arterial level intersections are designed to allow transit and other HOV vehicles to bypass costly delays. The City is also investigating the possibility of introducing computerized signalization and transit vehicle detection within the downtown core to allow the coordination of signal cycles and bus schedules to improve upon traffic-related delays.

Site-based Trip Reduction Plan Requirements

In 1991 the State of Washington passed legislation establishing the Commute Trip Reduction (CTR) program. The City is responsible for administering and enforcing the CTR requirements which require employers of 100 or more employees to implement programs to encourage employees to utilize alternative modes. Targets for reductions in total employee-related vehicle kilometers/miles of travel are a 15% reduction over 1992 by 1995, 25% by 1997, and 35% by 1999. These thresholds have remained in place, but enforcement has focused on plan formation and implementation rather than solely on vehicle kilometers/miles of travel reduction results.

The City also requires TDM plans of all developers as part of the development approval process. In order to gain approval, plans must account for increases in vehicle trips to the site and specify ways of mitigating or eliminating those trips.

Private Sector Efforts

The various TDM and CTR plans at the developer or employer level include a full range of TDM measures:

- Rideshare Matching (often with the assistance of the regional ridesharing network);
- Guaranteed Ride Home (GRH);
- Vanpool Support Programs;
- Bicycle Support Facilities;
- On-site Pass Sales and Subsidies, coupled with Transit Promotion;
- Market Pricing of Parking;
- Preferred Carpool/Vanpool Parking; and,
- Employee Transportation Coordinators.

One example illustrates the effectiveness of the private sector initiatives. The Seattle office of the consulting engineering firm of CH2M HILL relocated from a suburban Bellevue site to the CBD in 1985. With nearly 350 employees accustomed to free and ample parking at their suburban site, a voluntary TDM program was implemented to overcome the reduced parking supply and fees charged at the new CBD site. The approach of the TDM program was to reward employees for not driving alone by subsidizing those who selected to use transit and carpool. Employee participation in developing the TDM program was encouraged. The first year result was a dramatic reduction in the drive alone commute mode, to 55% from 89% at their suburban location. By the fourth year the drive alone mode was down to 52%, carpooling at 7%, and transit up to 20% from the 1% at their suburban site.

Developing Equitable Implementation Strategies

Early phases of implementation relied on City funds. Neighborhood residents expressed concerns that the City decision-makers were catering to downtown interests at their expense. Today, equity is the primary consideration in the financing of public improvements. The key concept behind funding is that those who benefit must pay their fair share.

Soon after the CBD Subarea Plan was adopted, developers complained that there were too many Local Improvement Districts (LIDs) to pay for infrastructure improvements and that the City had difficulty determining what the LID charges would be for a specific development project. In response, the City prepared the CBD Implementation Plan financing strategy. The CBD Implementation Plan had three objectives: increase mode split, increase freeway access, and increase street capacity. To determine fair share costs, the City used a finance model. This model was based upon four central ideas: fair share costs for all, simplicity, use of outside resources and a balance between existing and developing properties.

An important concept of the finance plan is that of "customer classes." Different groups of people (customer classes) both inside and out of Bellevue receive benefits from the downtown. Customer classes are then considered as revenue sources. For example:

- people throughout the region, include *visitors and commuters* use downtown Bellevue;
- *downtown property owners* derive obvious benefits from downtown improvements;
- many *businesses* depend on downtown and its services;

- and the *City as a whole*, including residents, shoppers and businesses outside the CBD use and benefit from downtown.

For each of the customer classes a table was created looking at each capital improvement and estimating the functional benefits for each improvement. Functional benefits are distributed and cross tabulated with the customer classes, and the resulting classifications have produced model results which allocate proportional costs to benefits for each customer class.

Current Problems and Issues

Retail Shoppers Can't Walk From Store to Store

The most significant problem in Downtown Bellevue is that the peak traffic period is at lunch time. Shoppers have to drive from store to store because of the strict monitoring of the free supply of retail parking. Even though there is shared parking, parking monitors issue tickets and tow the cars of customers who park at one retail outlet's parking lot and walk across the street to shop at another store. Customers have to drive from retail outlet to retail outlet and thus, defeat the City's vision of a truly pedestrian-oriented downtown.

Slow Infilling of the Pedestrian/Bicycle Environment

Even with CBD design guidelines, it is taking considerable time for the pedestrian corridor to develop into a "street." The existing pedestrian facilities in the downtown area consist of sidewalks along streets, mid-block and intersection crosswalks, and curb cuts for wheelchair access. There are existing deficiencies on streets lacking sidewalks or those that have narrow, obstructed sidewalks.

Some intersection crosswalks do not have curb cuts. The downtown has few facilities specific to bicycle circulation such as off-street bike paths. Bicycles may share the street with vehicles on unmarked bike lanes.

The Sidewalk Design Guidelines set forth specific standards and guidelines according to which individual projects maybe evaluated with respect to the relationships between buildings and sidewalks. The guidelines emphasize qualitative rather than quantitative measures. Some of the key concepts are:

- Provide pedestrian connections from neighborhoods to the CBD.
- Provide pedestrian access corridors within superblocks.
- Install signalized mid-block pedestrian crossings.
- Complete the downtown sidewalk grid.
- Evaluate grade separating certain pedestrian crossings.
- Provide pedestrian safe zones in the arterial medians.

The guidelines consist of a map designating a hierarchy of street right-of-ways, with the greatest attention given to those within and around the core design district. For each street in the hierarchy, design guidelines define the level of pedestrian amenities and ground floor uses desired. The overall intent of the guidelines is to foster the creation of a physical environment which supports pedestrian activity and use, including creating a protected and enclosed environment with physical and visual access. Each proposed project that abuts a public right-of-way is required to prepare a master plan for evaluation and approval by the Director of Design and Development.

Bellevue's implementation plan for improving pedestrian/bicycle circulation in the CBD is to complete the network of sidewalks where they are missing on streets and through superblocks. In addition, the plans call for connecting pedestrian paths between neighborhoods and the CBD. Pedestrian amenities such as lighting, benches, and landscaping will be installed in various CBD neighborhoods. Finally, Bellevue will install signalized mid-block crossings at key locations.

Future Directions and Opportunities

The nature of what makes downtown Bellevue attractive has changed. Location is not as critical. Entertainment is the new draw to the CBD. Promising future developments include the interest on the part of three developers to build a 10 to 12 screen cinema complex downtown, the strong and increasingly diversified and upscale regional retail market, and the development of mixed-use high-rise housing.

Conclusions

Downtown Bellevue demonstrates that strict control and pricing of the supply of employee parking can be effectively implemented to reduce SOV use without creating barriers to the development and leasing of new office space.

The key lesson is that for developers and employers to decide to locate in a priced parking environment, sufficient economic incentives, locational advantages, and transportation demand management programs are needed to outweigh the perceived inconvenience to commuting employees. Therefore, both public and private sector players need to work cooperatively to spread

the risks associated with a priced parking strategy. This will require the public sector to provide specific benefits or incentives. In particular:

- In order to encourage non-SOV travel behavior, the *public sector* must consider the financial risk associated with investing in improved transit service, pedestrian amenities, and transportation demand management programs. The public sector must also assume responsibility for encouraging the private sector to locate and develop employment uses by assisting to reduce the cost of the delivery of office space to the market. This can be achieved through policies allowing increased floor area ratios, encouraging an attractive mix of uses, and setting low maximum and minimum parking requirements. Key to the parking pricing strategy is controlling and maintaining a limited supply of public and private parking spaces.
- *Land owners and developers* must be encouraged to accept the market risk of providing office buildings with reduced parking supply relative to other office parks in the region. They must also carry the additional costs of providing pedestrian-oriented amenities and uses. Most importantly, they must negotiate office space leasing terms with tenants regarding the employer's parking and transportation needs. In particular, they must be willing to phase the price of parking over time to market prices, in order to reduce the cost to employers to offer financial incentives to their employees to encourage non-SOV travel behavior.
- *Tenants and employers* need to work with the public sector, land owners, and developers to encourage non-SOV travel behavior and to provide financial incentives to employees to encourage ridesharing and transit use. This requires employers to offer financial incentives and carry the costs of staff time to manage employee transportation needs.

What is clear from the Bellevue case is that there needs to be sufficient political will, clear initial action, and long term commitment to

implement a visionary plan. With this basic framework in place, Downtown Bellevue demonstrates that the concentration and intensity of employment and retail uses can be increased in a suburban location without complete reliance on SOV accessibility. Over the ten year period the program has been in place, trends indicate strong long term retail and employment growth, an increasing diversification of activity, and decreasing SOV use.

Case Study #2: Pleasant Hill BART Station, California

Introduction

Through a combination of public and private sector actions and effective transportation demand management programs, significant improvements in transit ridership, and reductions in single occupant vehicle commuting have been achieved at the Pleasant Hill BART Station. This case study explains the history of the development of the station area and evaluates what actions were successful and unsuccessful in shifting travel behavior out of single occupant vehicles to other modes of transportation.

Site Description

Located 48 kilometers (30 miles) east of San Francisco, Pleasant Hill is strategically located in the center of one of the Bay Area's fastest growing suburban areas. With a direct transit connection to San Francisco via BART's Concord Line, the area has long been attractive to city-center workers who seek the comforts of suburban living. Similarly, Pleasant Hill is located along the I-680 corridor, the primary suburban growth area in Contra Costa County.

The 52 hectare (130 acre) case study site is comprised of the area immediately surrounding the Pleasant Hill BART Station. In the early 1970s, the site was semi-rural in character. By the early 1990s, the area had transformed into a regional employment, housing and transportation hub with approximately 93,000 square meter (1 million square feet) of Class A office, a 250 room Embassy Suites Hotel and over 1,200 multi-family residential units.

The Pleasant Hill BART Station area consists of a campus-style street network of two and four lane arterials bounded by a major eight lane arterial (Treat Boulevard) and I-680. The adjacent Oak Park Road interchange provides direct freeway access to the area. Treat Boulevard, designated a "Route of Regional Significance," is a major connection between Concord and Walnut Creek carrying over 40,000 vehicles per day. Congestion during the peak commute periods can be severe. Congestion on I-680 is also severe in the peak periods. The reconstruction of the nearby I-680/24 interchange, when completed, should relieve some of the freeway and Treat Boulevard congestion. Within the station area, traffic congestion is light during most of day because the street system does not provide a route for through traffic.



The transit focus of the activity center is the BART station which serves as a local and regional hub for rail and bus service. BART provides frequent all-day and evening service along the Concord to San Francisco line with connections to the other lines serving the Bay Area. The Contra Costa County Transit Authority (CCCTA) provides a network of lines connecting the BART station with the surrounding neighborhoods and the cities of Pleasant Hill, Concord, and Walnut Creek. However, because of low demand, CCCTA is reducing service to the Pleasant Hill BART Station.

A privately operated shuttle bus provides frequent midday service for area employees and residents to local neighborhood shopping center, downtown Walnut Creek, and the area's regional shopping center during the holidays. Demand is high for the shuttle to the local neighborhood shopping center which has consumer service such as banks, drug stores, dry cleaners, etc.

Travel Behavior

Changes Over the Past Decade

Significant improvements in transit ridership and reductions in single occupant vehicle commuting have been achieved at the Pleasant Hill BART Station. Table 3 illustrates the change in commute mode splits for workers and residents in the Pleasant Hill BART Station area over the past decade. Key findings include:

- Employees in the Pleasant Hill BART Station area have experienced a dramatic shift to carpooling and transit since 1980. The drive alone share has steadily decreased from 81% to 67%, while carpooling has increased a third to 15% and transit use has almost

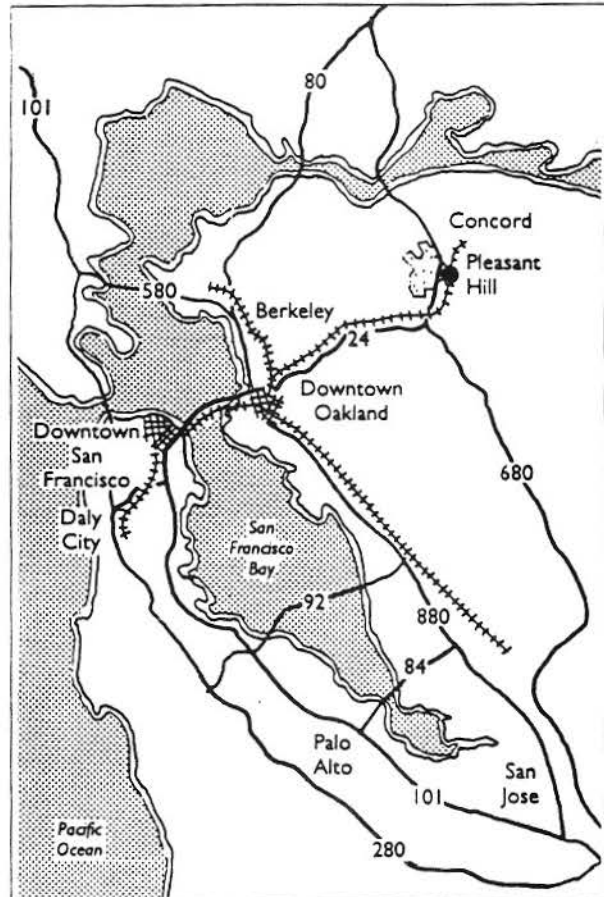


Figure 53: The Pleasant Hill BART Station is located in the fast-growing suburbs east of San Francisco.

doubled from 6% to 10%. The shift in mode split coincides with the formation of a privately operated Transportation Management Agency (TMA) in 1988 for the BART station area.

- According to census data, residents who commute out of the activity center have increased their use of SOVs from 55% to 69% and reduced their use of carpools and transit. A recent survey of residents (Cervero), however, indicates that 47% either drive alone or carpool, while 45% use BART and 5% buses. Since this survey, the TMA estimates that two-thirds of station area residents use BART to commute. Regionally, commuters have increased their use of SOVs despite a dramatic growth in congestion on Bay Area highways.

Present Commute Modes

The key information summarized in Table 3 shows that:

- Despite an abundant parking supply and employer-provided free parking, employees still have a significant level of carpooling (15%) and transit use (10%). Although the bus system is used little (1%) by employees, 7% use BART and there is a 2% mode for employees that use a combination of BART and bus. The low walking and biking use (2%) reflects the small number of nearby residents employed in the BART station area. Implementation of a trip reduction ordinance in 1988 played a significant role in changing employee travel behavior. While BART travel remained relatively constant, the TMA incentives boosted carpooling and bus ridership with its vanpool program, rideshare matching, transit subsidies, and free midday shuttle to commercial areas.
- Compared with the overall mode split of employees in the region, employees of the Pleasant Hill BART Station area drive alone 13% less and carpool 5% more. The transit share of BART Station area employees is substantially higher than the region (10% versus 3%) because of the proximity to BART and other employer based trip reduction programs. Within Contra Costa County, transit use is significant for work trips to and from San Francisco with 44% using transit and only 34% driving alone.
- Based on census data, residents in the BART Station area use transit (13%) more than residents on a regional basis (9%).
- Other resident surveys in the station area show a greater level of non-SOV travel than the census. On average, 47% of residents either drive alone or carpool while 45% use

BART, 4% buses and 3% walk. Since this survey, the TMA estimates that two-thirds of the station area residents use BART to commute.

- Proximity to the station is the primary factor for residents using BART to commute. The surveyed residential developments are 550 meters (1,800 feet) or less from the station. The Cervero survey shows a large difference in the internal mode of travel (home to BART) between commute trips and all trips combined. While the majority of commuters drive to BART (54%), the primary mode for all trips from home to BART is walking (89%). The reason for this difference is likely that most non-work trips are made in the day while commute trips often end in the evening when it is more convenient and safer to drive home.

Despite these advances, travel behavior at the Pleasant Hill BART Station Area could be significantly improved. Two fundamental problems are:

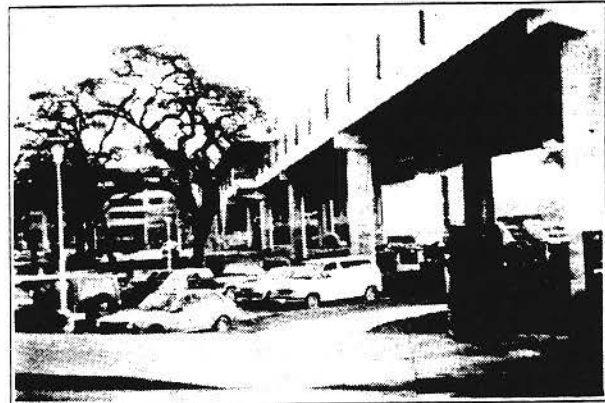
- According to a 1992 survey of residents living within 550 meters (1,800 feet) of the station, on the journey to work, 54% drive to the station, 22% walk and 16% ride the bus to BART (Cervero).
- This behavior is perhaps due to the fact that the station area is not mixed-use. It is predominately segregated into residential and office development. Employees are dependent on a midday shuttle service to get to the local neighborhood shopping center, downtown Walnut Creek, and the regional shopping center. Few people both live and work in the station area and there are few opportunities for trip linking and station area trip internalization.

Keys to Success

Success at the Pleasant Hill BART Station in shift commuting patterns from single occupant vehicles to regional transit and carpooling is a result of the following site characteristics and public and private sector actions.

Central Location in the Region with Strong Population and Employment Growth

Primary to the success of the Pleasant Hill BART Station area is its central location in Contra Costa County, along the I-680 corridor. The planned freeway access and anticipated population growth in the surrounding suburban communities of Pleasant Hill, Walnut Creek, and Concord led BART planners to chose the Pleasant Hill Site to locate a BART station.



For the private sector to invest in office and residential development, and for lenders to provide investment capital, there must be a market for new development. The I-680 corridor provided a strong market for development. During the 1970s and 1980s, the surrounding

Table 3
Comparative Mode Splits
Pleasant Hill BART Activity Center

Travel Mode	Prior to Redevelopment			After Redevelopment			
	Pleasant Hill BART		Region	Pleasant Hill BART		Region	
	Employees (1)	Residents (2)	Residents (2)	Employees (1)	Residents (3)	Employees (4)	Residents (3)
Drive alone	81.0%	55.4%	58.0%	67.1%	68.5%	74.0%	68.3%
Carpool/Vanpool	10.0%	20.6%	15.8%	15.0%	11.2%	9.0%	13.0%
BART	-	14.0%	3.1%	6.5%	12.1%	5.0%	2.8%
Bus	-	1.0%	13.2%	1.2%	1.3%	7.0%	6.3%
BART/Bus	-	-	-	2.2%	-	-	-
All transit	6.0%	15.0%	16.3%	9.9%	13.4%	13.0%	9.1%
Walk	-	2.8%	5.1%	1.0%	1.8%	2.0%	3.6%
Bicycle	-	-	-	1.0%	0.6%	2.0%	1.1%
Motorcycle	-	-	-	-	0.2%	1.0%	0.5%
Worked at home	-	1.9%	2.0%	-	3.0%	-	3.5%
Other	3.0%	4.3%	2.8%	6.0%	1.3%	-	0.9%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sources:

- (1) Contra Cost Centre Association, 1987-1994 data.
- (2) 1980 Journey-to-Work Census data.
- (3) 1990 Journey-to-Work Census data.
- (4) Commute Profile '92, Rides for Bay Area Commuters, Inc., July 1992

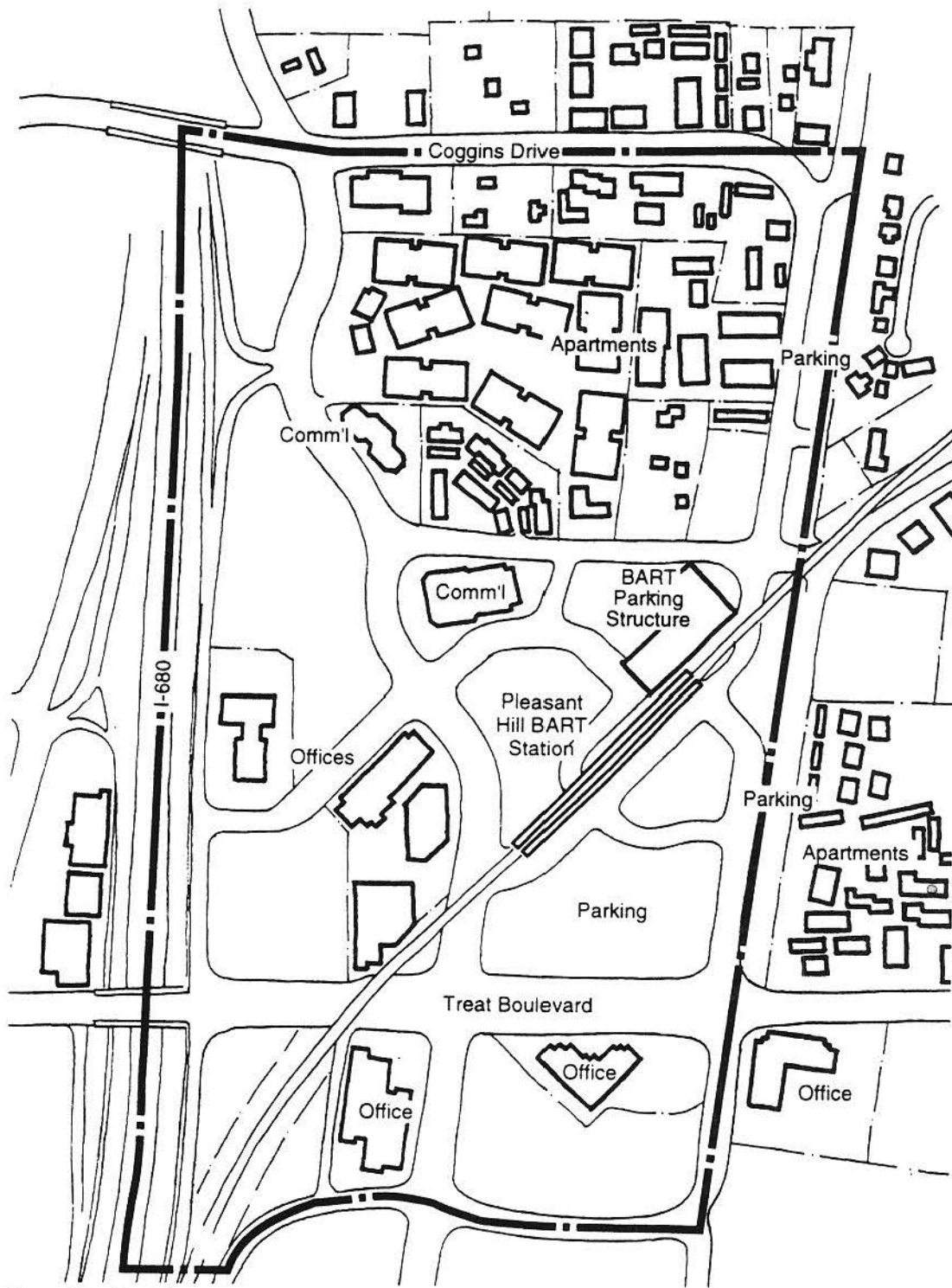


Figure 54: The Pleasant Hill BART Station Area.

communities provided housing for the rapid population growth in the East Bay and greater Bay Area. Supporting this increase in population was rapid growth in employment in the region and in Contra Costa County. For the I-680 corridor, office employment grew 83% for the finance, insurance and real estate (FIRE) sector and 111% for business services, adding 5,592 jobs. This rate of office job growth substantially exceeds the rates for the three central Bay Area counties, Alameda, Contra Costa, and San Francisco, at 12% FIRE and 73% for Business Services.

Coordinated Government Action

In 1975, Contra Costa County prepared an Area Plan for the BART station and its surroundings. However by 1979, it became clear that the Plan was not attracting private sector investment. The key policy of the plan, stipulating a 1.2 hectare (three acre) minimum parcel size for commercial or housing development, did not provide a sufficient incentive for development.

Hence in 1979, Contra Costa County, along with the other neighboring jurisdictions, decided that given the quality of the location and the significant public investments in regional accessibility, the Pleasant Hill BART Station needed a pro-active strategy to fully capitalize on its merits. In 1980, a Specific Plan was developed under the regional cooperation of several neighboring jurisdictions: Contra Costa County, the cities of Walnut Creek and Pleasant Hill, along with BART and local land owners. By 1983, the Specific Plan was adopted, and it was hoped that a coordinated plan for concentrating development around the Pleasant Hill BART Station would help alleviate regional traffic concerns. Finally, Contra Costa County formed a Redevelopment Agency in 1984 to

facilitate development in the area. Through the use of eminent domain power, the Redevelopment Agency assisted in the assembly of sites and used property tax increments to finance \$40 million in road and drainage infrastructure improvements. The private sector, through the use of development fees, assessment districts, special tax districts, and land dedications financed an additional \$40 million in infrastructure.

Pro-Active Planning for Development in the Station Area – The Specific Plan

The Pleasant Hill BART Station Specific Plan is comprised of a land use plan; a set of policies related to land use, transportation and urban design; development standards; and a public improvement plan.

Specific Plan Objectives

The key objectives of the Specific Plan are to increase the concentration of high intensity employment and housing immediately adjacent to the BART Station. Secondary to this was the objectives of providing sufficient retail, commercial, and open space uses for employees, residents, and BART patrons. The plan also calls for:

- developing pedestrian areas with human scale and design;
- building in a manner that is functionally and visually compatible with surroundings;
- protecting existing housing from adverse impacts of intensification;
- maximizing the use of public transit by business/employees in the area;
- improving local transit to area;
- improving auto access to BART station from Pleasant Hill;



- discouraging auto traffic that preempts roadway capacity needed for area land uses;
- providing safe and convenient pedestrian movement in area; and
- expanding BART parking facilities consistent with the objective of encouraging transit use and reducing long term employee parking for commercial uses.

Sub-Area and Development Standards

The Specific Plan consists of four major sub-areas with the following development standards:

1. **The Station Core Area** – This area is to provide community identity, a “sense of place,” and the greatest intensity of both commercial and residential development within close walking distance to BART. The floor area ratio for new development is most intensive in this area, at 2.25. Building heights may be 5 to 10 stories (15 as conditional use). Parking must be structured.
2. **North of the Station** – This area is to develop as a coherent residential neighborhood and add substantial housing opportunities at higher densities in close

proximity to BART. A minimum net residential density of 14 dwelling units (du)/hectare (35 du/ac) is set, with a 3 to 5 story height limit. Parking may be either structured or surface.

3. **South and West of the Station** – This area was originally to develop as a commercial/office concentration. The floor area ratio for new development is less intensive in this area, ranging from 0.75 to 1.0. Building heights may be 3 to 5 stories (7 as conditional use). Parking must be structured. Currently, amendments are proposed to encourage a mix of commercial, residential and retail uses.
4. **Fronting the I-680 Freeway and along Buskirk Road** – This area is planned for less intensive commercial office use. The floor area ratio for new development is less intensive in this area, at 0.75. Building heights may be 3 to 5 stories (7 as conditional use). Parking must be structured.

Developers can also capture development potential by transferring development rights to adjacent or nearby properties. The transfer of development intensity to alternate development areas does not increase the area-wide development potential. The development transfer provision is used to consolidate development for the purpose of retaining land for future development and create rational development sites. No more than 20% of the base floor area ratio for parcels under single ownership may be transferred.

Effectiveness of the Specific Plan

The Pleasant Hill BART Station area has not developed into a pedestrian-friendly area primarily due to the development standards set forth by the Specific Plan. While the area contains a variety of land uses – office, residential, transit, day care – the spatial configuration of these uses is dispersed and disconnected. The development standards for

open space (20% to 30% of net developable land), large setbacks, and required structured parking tend to force developments into stand alone high rise buildings surrounded by poorly utilized open space. This development pattern has four critical drawbacks: it discourages pedestrian activity, poorly defines streets, impedes future intensification of residual areas of the parcel, and prevents development of a core activity center within the area.

Use of Redevelopment Powers

To implement the Specific Plan a Redevelopment Area was established in 1994 for the Pleasant Hill BART station area. This helped to solve two critical concerns:

1. the inability of the private sector to achieve full assemblage of logical development sites;
2. the inability of the private sector to absorb 100% of significant infrastructure costs associated with developing at the desired intensities and still have financially feasible development projects.

The successes at the Pleasant Hill BART Station are a direct result of the Redevelopment Agency's implementation actions. The Redevelopment Agency used the following powers to assist in the implementation of the Specific Plan:

- assemble land and deliver sites feasible for more intensive commercial and residential development to the private sector;
- provide infrastructure financing through property tax increments;
- manage the collection and expenditure of private sector contributions for infrastructure improvements, including assessment district and community facility district assessments;



- manage the construction of public improvements prior to or concurrent with development, including traffic and circulation, drainage, utilities, and fire station facilities; and
- provide financial assistance and participation in the development of affordable housing;

Using these tools, the Redevelopment Agency collected and spent approximately \$16 million on traffic improvements and \$3 million in drainage and utility improvements. An additional \$3.85 million were used to purchase right-of-way, plus \$3.65 million for additional right-of-way purchase and repayment of agency debt. Approximately \$12 million in bond proceeds are reserved for construction of an arterial and other circulation improvements.

A Local Transportation Demand Management Agency

The area surrounding the Pleasant Hill station experienced a surge in office-related development in the early 1980s, prompting the creation in 1988 of the Contra Costa Centre Association (CCCA) to coordinate TDM efforts among the area's largest employers. Contra Costa County has had a trip reduction ordinance (TRO) in place since the late 1980s, providing an added impetus to the creation of the TMA. The BART station is located within unincorporated Contra Costa County, between Pleasant Hill to the north and Walnut Creek to the south. As such, it would normally fall under "TRANSPAC," the transportation coordinating organization designated by Contra Costa County for the five towns of Clayton, Concord, Martinez, Pleasant Hill, and Walnut Creek. However, the County and TRANSPAC have given CCCA the lead role for the Pleasant Hill station area. At present, the CCCA is offering a wide range of services to its clients which are outlined below.

CCCA can be characterized as a strong TMA. In addition to the County's TRO requirements, there is also a regional requirement, Regulation 13, for employer-based trip reduction programs. In 1992, the Bay Area Air Quality Management District (BAAQMD) adopted Regulation 13. Closely modeled on southern California's Regulation XV, Regulation 13 applies to all employers with 100 or more employees, and has established average vehicle occupancy (AVO) target of 1.4. The TMA essentially solicits all affected employers within its jurisdiction to join it, and in return CCCA provides them with all of the expertise and information needed to comply with the law and set up demand management programs. CCCA does all of the surveying and

reporting to the relevant State and regional agencies, and runs an active demand management program with the following elements:

Vanpool Program - CCCA owns and maintains an eight vehicle fleet, which it leases, at reduced per kilometer/mile and fixed-rate fees, to commuters to the Pleasant Hill BART area. All vans were purchased with a combination of CCCA's own funding (from a dedicated county tax) and State agency support.

Free Midday Shuttles - Three of the vans from the vanpool program are turned to midday use as the rolling stock for a midday shuttle, running from 10am to 2:30pm, from the BART station to key employment sites. Drivers are under contract with CCCA to provide the service.

Carpool/Vanpool RideMatch - CCCA coordinates its matching efforts with the regional carpool/vanpool matching service, RideMatch.

Guaranteed Ride Home (GRH) For vanpool/carpool commuters.

Transit Subsidy and On-site Pass Sales - Newly funded, primarily from CalTrans. A nearby interstate freeway interchange is entering a particularly disruptive phase of its reconstruction, and CCCA has obtained funding for a subsidy to be offered to transit riders beginning March 1 of this year. Commuters who would normally use the facilities connected to the interchange are being targeted.

Mode	1987	1988	1989	1990	1991	1992	1993	1994
Drive Alone	81%	82%	83%	77%	70%	73%	71%	67%
Carpool	10%	13%	10%	10%	13%	11%	10%	13%
Transit	6%	4%	3%	9%	11%	11%	8%	10%
Vanpool	---	---	---	---	4%	2%	3%	2%
Walk	---	1%	2%	2%	2%	3%	2%	1%
Bicycle	---	---	1%	1%	---	1%	1%	1%
Other	3%	---	1%	1%	---	---	5%	6%

Measures of Effectiveness

CCCA has been keeping track of its modal use over the last eight years, and the data appear to be encouraging, particularly related to an almost doubling in the transit share (Table 4). The 1994 CCCA survey data yielded an unadjusted AVR of 1.30, and when compared to an AVR in 1987 of 1.19 highlights a significant change in modal use. Clearly, some of the TDM measures are having an affect on employees commute options within the CCCA. However, in the absence of more specific data, it impossible to identify the impact of individual TDM actions.

Public and Private Parking

BART recently constructed a 1,200 space parking structure to accommodate present demand as part of BART's capital improvement program. Since there appears to be no significant change in BART ridership at the Pleasant Hill station before and after construction of the garage, it seems that the additional parking serves existing demand. Much of this demand had been parking on-street in the surrounding residential

neighborhoods. Several hundred "temporary" parking spaces are located within the former Southern Pacific railroad right-of-way located along the eastern edge of the site. The lease for these spaces has been renewed and will continue to provide capacity for spillover demand. The BART station parking supply is anticipated to decrease in the future as the Southern Pacific right-of-way is utilized for other purposes and BART develops its surface parking lot.

Buildings in the area have ample parking in either structures or surface lots. About 75% of the building tenants park for free as a condition of their lease. Parking charges, where applied, are relatively low. The station area parking ordinance permits reduced parking as low as 0.5 spaces per 93 square meters (1,000 square feet), but to attract tenants and obtain bank financing developers have provided substantially more than this.

On-street parking in the immediate surrounding residential neighborhoods is controlled with restrictions to discourage commuter parking. The restrictions, applied in the morning commute period, are not fully effective and

certain streets are considered problem areas. Presently, enforcement is the only program to address spillover parking.

Public Participation in the Development of Affordable Housing

The Redevelopment Agency participated in the financing of affordable housing in the station area in order to generate higher transit ridership. Participation took the form of land cost write downs and tax exempt assessment district financing. For the Park Regency project, a 892 unit multi-family housing development at a density of 28 du/hectare (70 du/ac), 15% of the units were set aside as affordable to low income families. The subsidy was a land cost write down for the prorated share of the units.

Current Problems and Issues

Travel behavior at the Pleasant Hill BART Station Area could be significantly improved. Two fundamental problems are:

- According to a 1992 survey of residents living within 550 meters (1,800 feet) of the station, 54% drive to the station, 22% walk and 16% ride the bus on the journey to work.
- Employees are dependent on a midday shuttle service to get to the local neighborhood shopping center, downtown Walnut Creek, and the regional shopping center during the holidays. Few people both live and work in the station area. There are few opportunities for trip linking and station area trip internalization.

These problems are a result of several factors and decisions by both private and public sector players which have effected the development pattern of the station area:

Lack of Development at the BART Station Area

Ironically, BART has been one of the key obstacles to intensification in the area adjacent to the station area. BART received entitlements to the highest intensity of uses and has a development agreement with the County. The development agreement vests BART's right to develop its property as an integrated, mixed-use project as proposed in the Specific Plan. The development agreement also guarantees the maximum approved density of non-residential development at 117,500 gross square meters (1,265,000 gross square feet), with the stipulation that BART shall not develop a project of less than 55,740 gross square meters (600,000 gross square feet).

However, BART has chosen to sell its development rights, rather than build adjacent to the station. To date, BART has sold 14,500 square meters (151,914 square feet) of its development rights to other property owners in the station area. Additional transfers are planned.

Development adjacent to the station has also been hindered by BART's policy of only entering into long term ground leases, rather than fee simple sale of the land. This has proved difficult for the private sector to finance and has resulted in no development other than a 1,300 space BART parking structure in the prime development area immediately adjacent to the station. Large expanses of parking separate the currently developed sites from the station, giving the area an undeveloped appearance that is hostile to pedestrians.

Poor Pedestrian Access

Despite attempts to consolidate parcels and establish a new pattern of development, the Specific Plan has resulted in odd shaped sites and a poorly organized street system that has discontinuous pedestrian access. Office buildings are located in the center of each site, with parking structures and surface parking surrounding them. This contributes to poor pedestrian access through the area and to the BART station. Coupled with the poor street design, the area lacks spatial definition to create an active pedestrian and public open space realm.

Lack of Convenience Retail Uses

The station area is not mixed-use, it is predominately segregated into residential and office development. Few people both live and work in the station area. Given that there is very little convenience-oriented retail uses in the study area, there are few opportunities for trip linking and station area trip internalization.

Future Directions and Opportunities

The most promising developments are recommendations for amending the Specific Plan to expand the range of uses allowed in the plan area. This proposal would allow housing and mixed-use development, including retail uses, in the core area and the areas to the west and south of the station. If accompanied by effective implementation and development incentives, such uses would assist in creating a more active pedestrian environment. This could also encourage walking instead of driving, linking of trips and internalization of trips, and possibly persuading people to live and work in the station area.

One current proposal is to locate a ten-plex cinema complex at the station area. This could have the benefits of shared parking, nighttime activity, and the potential for the development of supporting retail uses. Another promising development is the planning of new high occupancy vehicle (HOV) lanes. HOV lanes could increase carpooling and bus service to the station area, for both San Francisco bound and station area bound commuters.

Conclusions

The efforts of the Contra Costa County Redevelopment Agency and the local TMA have gone a long way toward attracting intensive development and facilitating non-auto accessibility. Given the dramatic changes in SOV use since the Specific Plan was adopted, the approach used at Pleasant Hill should be a model for other suburban communities. Despite these successes, however, the Pleasant Hill site continues to fall short of its potential. The lack of development on the BART property immediately adjacent to the transit station and the absence of convenience retail uses signals that much more could be accomplished in the future.

Case Study #3: Downtown Santa Monica, California

Introduction

Downtown Santa Monica is an example of sensitive infill, pedestrian-oriented urban design, supplemental local transit service, and a coordinated parking and travel demand management system. Though not as large as many of the other case studies, Santa Monica is a leader in innovative planning. The high quality environment created here can serve as a model for communities throughout the country.



Site Description

Santa Monica is one of nineteen growth centers in the Los Angeles region. The community is uniquely situated adjacent to the Pacific Ocean about 24 kilometers (15 miles) west of downtown Los Angeles. Because Santa Monica is the logical extension of the Wilshire and Olympic Boulevard growth corridors, and also has a direct link to the Los Angeles International Airport via Lincoln Boulevard, it grew rapidly during the late 1980s and early 1990s.

Santa Monica has a reputation as one of the most desirable communities in the Los Angeles region, with a wealth of assets:

- An ocean frontage providing mild climate, better air quality than the majority of the region's suburban centers and a broad, accessible beach;
- A strong sense of place, created by the rich architectural and cultural heritage, a busy downtown, numerous vital neighborhood commercial areas, characteristic palm tree-lined streets, and well-tended parks – among them one of the greatest oceanfront parks in the world, Palisades Park;
- A convenient location with easy access to important destinations, such as Westside employment centers, the Los Angeles International Airport, and Downtown Los Angeles;
- The commercial viability of Santa Monica is greatly enhanced by its accessibility to several higher income residential areas: neighborhoods within Santa Monica and the nearby communities of Malibu, Pacific Palisades, Brentwood, and Marina del Rey; and
- A diversity of cultures and lifestyles accommodated in pleasant, stable, mature, and varied residential neighborhoods.

The study area is comprised of two sub-areas: the Bayside District and the Civic Center. Together, the two areas balance local and regional activities, with a concentration of civic, cultural, entertainment, shopping, tourism, recreation, housing, and employment uses.

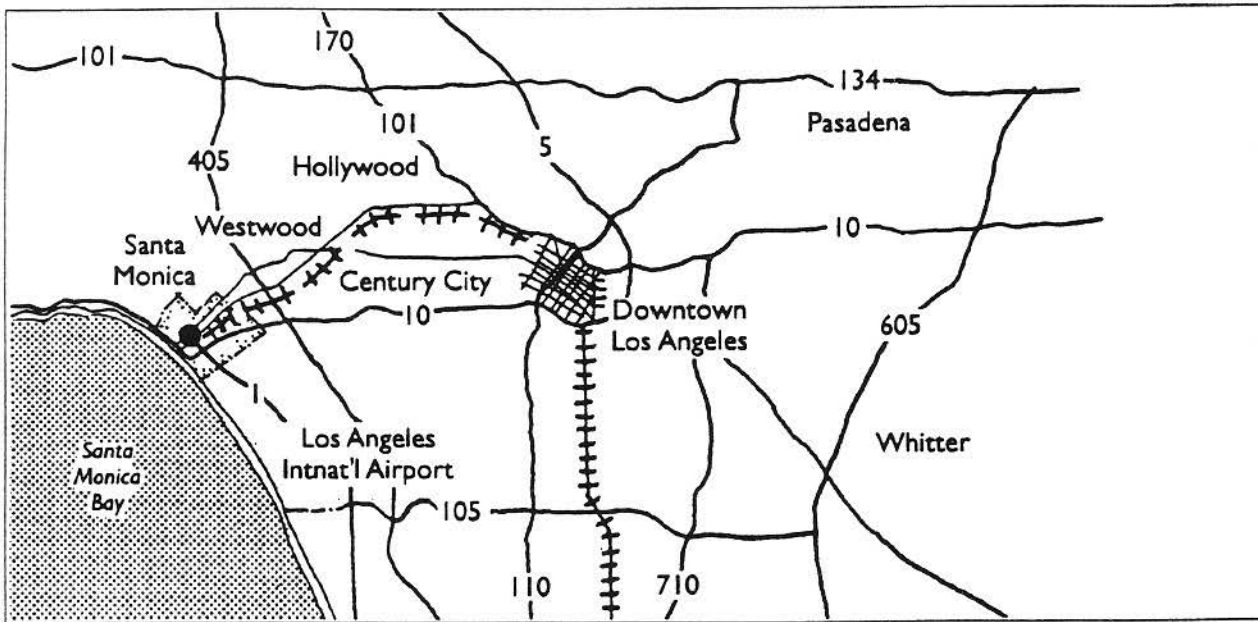


Figure 55: Downtown Santa Monica is an emerging hub of office and commercial activity, located at the western edge of the Los Angeles region. Proximity to the Los Angeles International Airport and other major transportation corridors have fueled recent growth.

The downtown core, or Bayside District, consists of 12 blocks (15 hectares/37 acres) extending from Second Street to Fourth Street and from Wilshire Boulevard on the north to the Santa Monica freeway on the south. It has a concentrated development pattern – dense, diverse, and mixed-use – which is linked to the Civic Center by a series of three bridges over the Santa Monica Freeway. Most of the buildings within the downtown area are mid-rise (3 to 5 story structures) with ground floor retail and upper story residential or office uses. Within this area there is a diversity of architectural styles:

Romanesque, revival, classical, commercial vernacular, Mediterranean, art deco, and streamline modern. Many of the structures have significant historic architectural details. Surrounding the core area are residential neighborhoods, several hotels, and office towers that are linked to the downtown by a gridded street and block system.

The 18 hectare (45 acre) Civic Center sub-area includes several large-scale employment uses, the RAND Corporation's office and research facilities, City Hall, the Police Station, the Los Angeles County Courthouse, and the Civic Auditorium. In the past, the Civic Auditorium was an active part of Los Angeles culture: it was the site of the Academy Awards and performances by '60s and '70s headlining rock and roll bands. In recent years use of the Civic Auditorium has declined and is in need of rehabilitation.

Since this sub-area contains no convenience retail uses, many of the area's employees regularly walk the few short blocks to the downtown core at lunchtime. Historically, the Civic Center site consisted of nine city blocks, today it is consolidated into two superblocks with Main Street being the only internal street.

The Bayside District and the Civic Center are well-served by Santa Monica Municipal Bus Lines (SMMBL), with eight bus routes offering frequent all-day and evening service to key transportation hubs and major activity centers throughout the region. From the downtown, bus routes serve every major destination in the region, including the Los Angeles International Airport transit center, University of California-Los Angeles, downtown Los Angeles, Century City, and other business and commercial centers and institutions. The system is dense throughout the study area, with a major route located less than 400 meters (1/4 mile) of every resident and employee. In fact, the SMMBL system is within walking distance of 98% of the residents city-wide.

All SMMBL routes pass through the intersection of Fourth Street and Santa Monica which serves as a convenient centralized transfer station. An express bus from downtown Santa Monica to downtown Los Angeles takes between 50 to 60 minutes on the highway (30 minutes faster than a comparable service provided by the regional transit agency RTD). Because there are no HOV lanes on the highways serving Santa Monica, a bus trip takes the same time as an SOV trip.

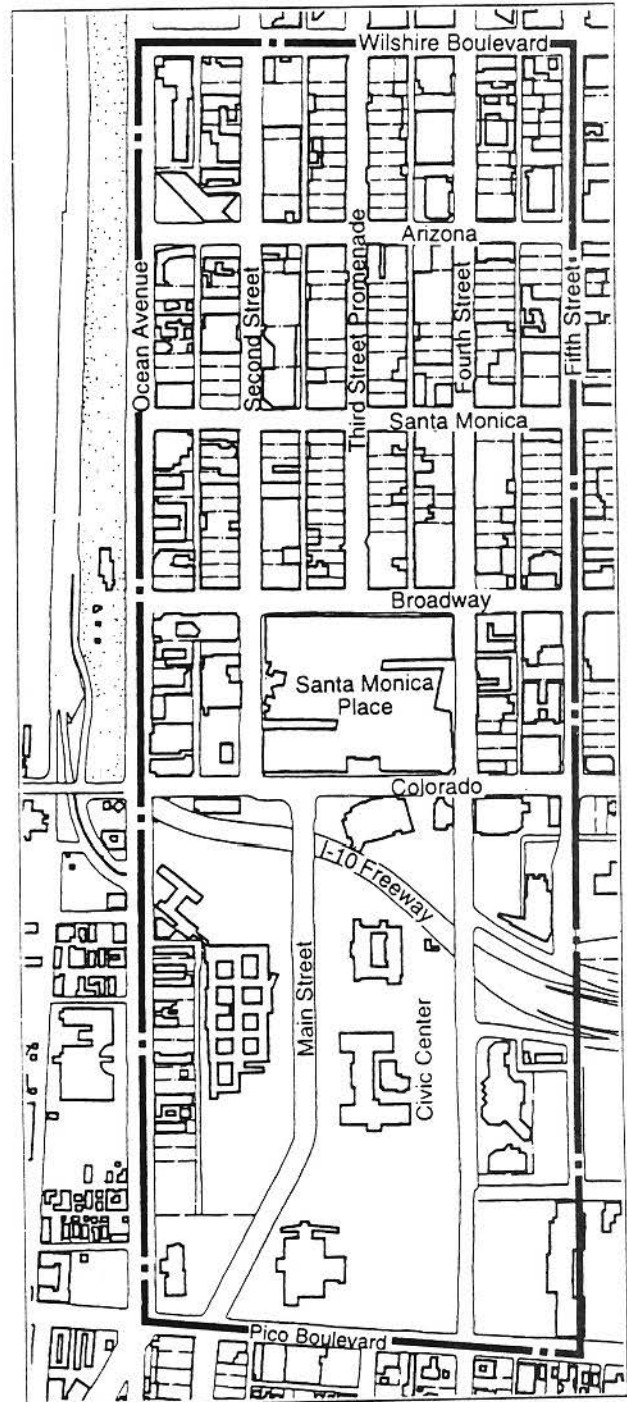


Figure 56: Downtown Santa Monica is built on a pattern of complete blocks and interconnected streets. Buildings are scaled to fit well with the historic fabric of the area.

History

Santa Monica's land use and circulation pattern, as well as its visual character, date back to its origins in the period between 1875 - 1900 as a seaside "beach community" and shipping port. Hotels, summer cottages, and visitor-serving commercial uses flourished because of its Mediterranean weather, serene lifestyle, sea, beaches, and well-tended parks.

The downtown is the historic commercial core of Santa Monica. In the 1880s Second Street was the main commercial street. In the early 1890s Third Street became the prominent commercial street and several buildings from this period still exist. As the City's function as a shipping port declined in the period between 1900 and 1930, the railroad continued to attract industry to the area. The newly built Pacific Electric Railway trolley line linking Santa Monica to Downtown Los Angeles, brought large numbers of tourists and attracted many full-time residents. It was during this period that the amusement-piers were built. Residential hotels continued to be built for tourists, and single-family bungalows were built for year-round residents. The majority of the historic buildings in the downtown were constructed in the 1920s. They established the area as a mixed retail, office, hotel, and entertainment district. The majority of the historic buildings are 3 to 4 stories with ground floor retail and office above.

Growth continued, but at a slower rate, during the next three decades. In the late 1950s merchants within the area became concerned with competition from malls that were being constructed in the surrounding metropolitan area. Following national trends, a plan was created for converting Third Street (the primary downtown shopping street) into a pedestrian



Figure 57: The Civic Center District includes City offices, as well as several large-scale employment uses.

mall. This closure of the street and the construction of six City-owned parking structures was completed in 1965. The project was relatively successful in the early years.

In 1966, the Santa Monica Freeway was opened, providing improved access to the rest of the Los Angeles region. It also had the effect of physically separating the Civic Center from the downtown. The freeway, though, brought about a boom in apartment and condominium construction that continued until the economic recession in the late 1970s. But with the 1980 opening of Santa Monica Place, an enclosed five-story shopping mall on Broadway between Fourth and Second Streets, and competition from other regional malls, the Third Street Mall began to decline.

The 1986 "Third Street Mall Specific Plan" led to the redesign of the pedestrian mall, along with plans and policies to encourage more intensive mixed-use development along the street. Implementation of the plan has been very successful, resulting in the construction of over 34,800 square meters (375,000 square feet) of new commercial and residential space, much of which has included the reuse of existing structures.

Travel Behavior



Commute Mode Split

Changes Over the Past Decade

As shown in Table 5, residents of downtown Santa Monica are driving alone as much now as 10 years ago. Today carpooling is up 2% since 1980, but transit use is 5% lower. Walking to work is lower than 10 years ago but still high at 16%. The shift in modes over the past decade is from one form of non-SOV travel to another (i.e. from walking and transit to carpooling and working at home). This is compared to the metropolitan region which has the highest auto ownership rates in the world and where SOV travel has increased slightly and other modes of travel have remained nearly constant since 1980. Compared to the metropolitan region, downtown Santa Monica residents drive alone nearly 20% less, take transit 2% more, and walk to work 13% more.

Present Commute Modes

Less than two thirds of downtown Santa Monica employees drive alone to work. Carpooling and transit have relatively high proportions of use at 28% and 10% respectively. The high use of carpooling is a result of Santa Monica's trip reduction ordinance which takes precedent over the less stringent regulations of the regional air quality district. The high use of transit for work trips is attributed to the award winning efficiency, high service standards, and dense route system provided by the Santa Monica Municipal Bus Lines.

Retail employees utilize transit at a significant level (22%) compared to office employees (3%). The use of transit by retail employees is partly due to socio-economic factors of the lower paying retail industry and partly due to Santa Monica's dense transit service focused around the downtown retail core.

Slightly over half of the downtown residents drive alone to work, while 10% carpool, 8% use transit, and 16% walk. A significant portion of Santa Monica residents (8%) work at home. The high level of non-SOV travel for downtown residents is indicative of Santa Monica's concentrated mix of land uses and dense transit system, as well as its pedestrian-friendly environment. The number of residents who work at home (higher than any of the other SAC case studies) is evidence of Santa Monica's diversity of lifestyles.

Keys to Success

Existing Urban Fabric Was Preserved

Three key aspects of the physical pattern of development in downtown Santa Monica have influenced travel choice:

1. The amount and concentration of development in the downtown area.
2. The diversity and mix of use in the downtown.
3. The pedestrian-oriented street environment within the district.

In downtown, the existing street and block pattern was laid originally out as a streetcar suburb. Short blocks were placed along the rail line and long blocks were situated perpendicular to the rail line. Narrow, deep lots maximized the number of units per block and mid-block alleys provided convenient service vehicle access. This gridded street

pattern provided the greatest number of pedestrian-accessible lots within the shortest walking distance of streetcar stops and local destinations.

A key aspect of the block pattern is its linking of the downtown with surrounding residential neighborhoods. Today, there are residential uses adjacent to the downtown, with direct and short pedestrian access. Proximity to the downtown allows those trips to be walking trips, instead of auto trips.

Despite the closure of Third Street to cars in 1965, the downtown's pedestrian-oriented block pattern, its fine grain parcelization, and small-scale, highly detailed buildings were generally preserved. This provided character and created value that has been continuously capitalized upon by downtown businesses and property owners. The subsequent efforts to prepare a

Table 5
Comparative Mode Splits
Downtown Santa Monica Activity Center

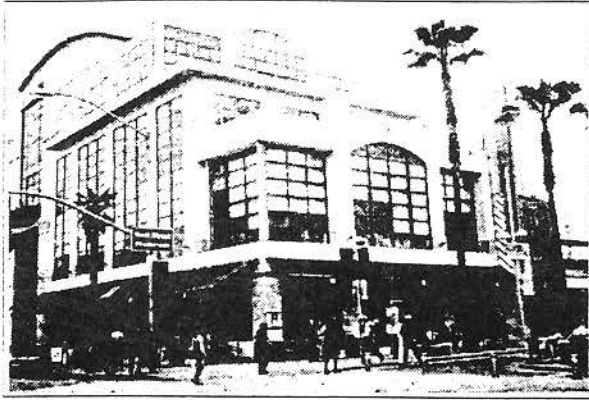
Travel Mode	Prior to Redevelopment (1)		After Redevelopment				
	Dt SM	Region	Downtown Santa Monica			Region	
	Residents		Major Employers (2)			Residents (3)	Residents (3)
			Office	Retail	TOTAL		
Drive Alone	51.6%	68.7%	63.2%	52.3%	59.5%	52.0%	70.1%
Carpool/Vanpool	7.9%	16.8%	30.2%	24.3%	28.3%	10.1%	15.5%
Transit	12.9%	6.9%	3.4%	21.5%	9.5%	8.0%	6.4%
Walk	19.0%	3.7%	1.7%	0.4%	1.2%	16.0%	3.3%
Bicycle	-	-	0.9%	0.6%	0.8%	1.9%	0.6%
Motorcycle	-	-	0.6%	0.9%	0.7%	2.7%	0.5%
Worked at home	6.3%	1.5%	0.0%	0.0%	0.0%	7.7%	2.7%
Other	2.3%	2.4%	-	-	-	1.6%	0.9%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sources:

(1) 1980 Journey-to-Work Census data.

(2) Employee commuter surveys (1994), South Coast Air Quality Management District

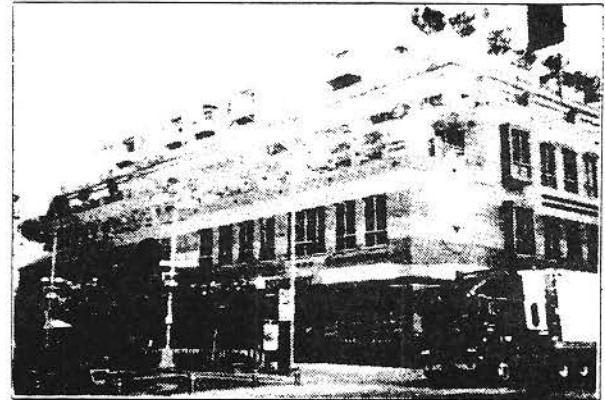
(3) 1990 Journey-to-Work Census data.



Specific Plan (see below) recognized the inherent value represented by this historic fabric and focused on its preservation and enhancement.

Thus, the City's ordinances and design guidelines place strong emphasis on the importance of diversifying the mix of uses within downtown while building on an entertainment theme, preserving the low to mid-rise massing and fine-grain architectural detailing, and making streetscape improvements that attract pedestrians and bicyclists.

Since the adoption of the Third Street Mall Specific Plan there has been an extensive amount of redevelopment along Third Street: over 34,800 square meters (375,000 square feet) of new commercial and residential space. This intensification is now expanding to the Second and Fourth Street corridors, and the recently adopted Bayside District Specific Plan has created additional incentives to encourage this growth. The current mix of land uses (local- and regional-serving retail, office, cinema, museums, restaurants, and some housing) creates activity throughout the week and at all hours of the day.



Public and private efforts have also resulted in a variety of street improvements:

- signalized pedestrian crossings;
- clearly defined places along Third Street for outdoor cafes, walking, and bicycling; and
- a coordinated street furniture program: benches, signage, kiosks, street lighting, etc.;

A Revitalization Strategy that Focused on Urban Design: The Third Street Mall Specific Plan

In the early 1980s the Third Street Mall area was largely characterized by small-scale uses serving low and moderate income groups. The area lacked major destinations and the commercial stores facing the Mall were too large for many tenant needs. The Mall had a variety of entertainment activities, but no organized schedule of attractions and events. It also lacked facilities and activities to support users of the Mall, such as children and seniors. Most downtown uses closed at 5:00 p.m.

The primary tool used for revitalization was the "Third Street Mall Specific Plan." The Specific Plan provides a framework of strategies for economic investments and physical improvements to be implemented by the City of

Santa Monica and the Third Street Development Corporation (TSDC). It was developed through an extensive citizen involvement process which included several community-wide design workshops. These public involvement efforts not only effected the urban design character and implementation strategies of the specific plan, it also created commitment from citizens and the business community to see the plans carried through.

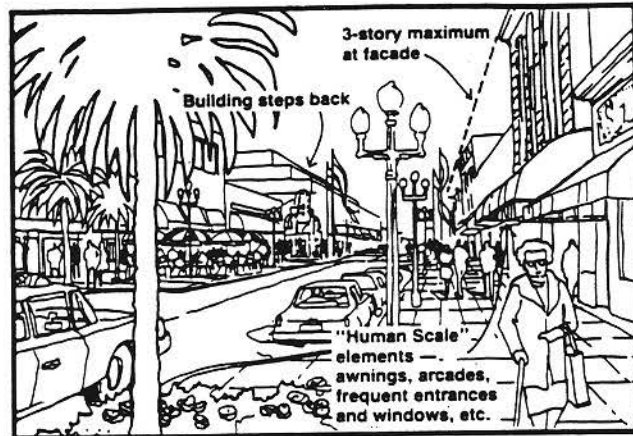
The Third Street Mall Specific Plan first established a theme for the mall's revitalization:

"...as the central core or gathering area for the City of Santa Monica, the mall is conceived as a dynamic "urban village," mixing a diversity of uses which can be established as the functional and symbolic center of the city. It would provide for the daily and special shopping needs of nearby residents, destinations for visitors and tourists, dining, entertainment and cultural facilities for both residents and visitors, new housing opportunities, office space for the business community, and outdoor activity space for all."

The Specific Plan successfully achieved many of the initial goals to improve the physical character of the downtown area and create an active pedestrian environment during the both day and night time hours.

Since the adoption of the Plan, the area has seen a tremendous amount of private investment, as well as extensive public improvements. In September 1989, a redesign of the Mall public spaces was completed and the area was renamed the Third Street Promenade. The street itself was reconstructed to reintroduce curbs and

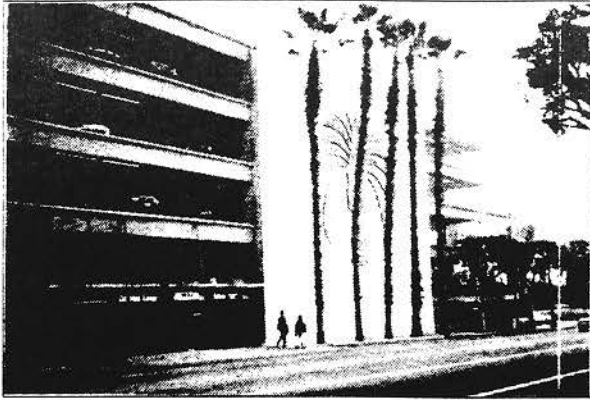
sidewalks, as well as a central "median." While designed to permit auto access if necessary, access today is limited to pedestrians, bicycles, and service vehicles. Retail pavilions were constructed along the central medians of each block, along with landscaping and water elements, public benches, street lamps, special signage, banners, and topiary dinosaur sculptures.



The Third Street Promenade improvements have been an effective catalyst for new private investment in the downtown core. Recent projects include mixed-use developments such as Jans Court, which combines movie theaters, restaurants, offices, and residential uses. Other projects revitalizing the area and encouraging pedestrian activity are the Mann Criterion and AMC multi-screen movie theater, numerous restaurants, and new office development.

Parking Management Tied to TDM and Urban Design Goals

Even during peak weekday and weekend periods, the downtown has a surplus of parking to serve visitors, employees, and residents. This is largely due to the presence of six large multi-story parking garages owned by the City and built in the late 1960s. Although currently metered, within the next twelve months these



garages will be switched over to free attendant parking for the first two hours. In addition, a city-wide 10% parking tax applies to all private parking lots. Parking standards for new development were recently amended to specify minimum set asides for carpools, vanpools, and bicycles.

Parking surveys in the area of the Third Street Promenade and Santa Monica Place indicate that the existing supply is 56% utilized during peak weekday times and 67% utilized during peak weekend times. Of the over 5,000 spaces in this area alone, the majority are reserved for high turnover use, with the remainder restricted to 4 and 12 hours and a small proportion (13%) leased or permitted for long-term employee parking. Little on-street parking exists (under 300 spaces) and it is restricted to short-term use.

The City's current regulations for the Bayside District allow buildings to be renovated and expanded without providing any additional parking; entirely new buildings must provide parking at a ratio of 1.5 spaces/93 square meters (1,000 square feet) of leasable retail and office space. This program appears to be very successful. During the period between 1986 and 1992 51,100 square meters (550,000 square feet) of new building area was constructed, yet only 810 additional parking spaces were built (one space

for every 63 square meters or 680 square feet). The Civic Center Specific Plan allows new parking structures with over 1,900 spaces for visitors and employees. Originally, the public parking structures were planned for 3,000 spaces but reduced as part of the planning process.

The City also allows reduced on-site parking requirements if a project's Transportation System Management plan clearly demonstrates that the parking is not necessary because effective and enforceable measures are being implemented to promote alternative modes of transportation. The City also permits shared parking arrangements once off-site and neighborhood intrusion impacts are analyzed.

The City levies a 10% tax on all private parking lots that charge for parking. The tax revenue goes into the City's General Fund. Employers who provide parking to their employees are not subject to the tax. The tax currently generates \$2.7 million in revenue for the City.

Efficient Local Transit System

Santa Monica Municipal Bus Lines (SMMBL) provides extensive service throughout the city and sets high service standards. The organization has won awards from the American Public Transit Association for its efficiency and effectiveness. SMMBL has been able to maintain nearly a 90% on-time standard. Its policy is to have standees for no longer than 1.6 kilometers (one mile) on all of its routes, and constantly monitors load factors to enforce the policy particularly on the downtown Los Angeles express. Transit use is encouraged by a subsidized 50 cent fare for local routes. Express routes to downtown Los Angeles are \$1.25, less costly than the regional transit agency.

A SMMBL passenger survey shows that the majority of riders use the system for work related purposes (49%) and 5% to 6% using the system for shopping. Because the routes serve several educational institutions (UCLA, Santa Monica College) nearly 26% of the passengers are students.

The City is also currently in the process of implementing a transit shuttle that links the beach, Main Street, downtown, and Civic Center to peripheral parking facilities. The shuttle service fills the gaps of the SMMBL by providing direct and quick service to remote employee and visitor parking lots. Thus, the intent is to get as many cars out of the Civic Center and Bayside District as possibly by provide an easy transit alternative.

Downtown Santa Monica is also designated as a "transit zone" and is a potential location for a multi-modal transportation center. In addition, the Regional Transportation Plan (RTP) designates three corridors in Santa Monica for future mass transit (light or heavy rail).

Comprehensive Pedestrian/Bicycle Program

The City of Santa Monica promotes walking and biking as alternatives to auto travel through policies to improve the pedestrian environment and the adopted Bicycle Master Plan. Pedestrians are accommodated with wide sidewalks, signalized crossings, and streetscape amenities.

The existing bike system in Santa Monica's downtown is limited to a few bicycle lanes on City streets. Most other streets allow bikes to share the streets with vehicles, but there are few designated bike routes. Implementation of the City's Bicycle Master Plan will add several



bicycle lanes on major streets and designate on-road bike routes to provide bike access to important downtown destinations such as the Third Street Promenade and the Civic Center. Additional improvements include removing the median turn lane on some streets to provide width for striped bike lanes or wider curb lanes.

The Master Plan designates the downtown as a bicycle parking district and provides extensive bike parking facilities (racks and mounts on parking meters) and a bike park-and-ride station at a centralized transit stop (racks and lockers). The regional transit agency (RTD) is experimenting with bike racks on the front of buses on one line and, if successful, will expand the service to other lines.

Aggressive TDM Programs

In offering a diverse mix of land uses within a concentrated area, downtown Santa Monica has created an environment supportive of alternatives to drive alone commuting. Offices, retail, entertainment, and housing are all in easy proximity to each other, encouraging walking, bicycling, and transit use for work and other trip purposes. However, as a major work destination, Santa Monica has experienced increasing traffic congestion and air quality

problems. In response, the City of Santa Monica passed a trip reduction ordinance which is more comprehensive than the regional air quality regulation. The City has contracted with a local transportation management association, and also makes available its own transportation management program staff to assist employers and developers comply with the trip reduction ordinance.

Trip Reduction Ordinance

The City of Santa Monica has a memorandum of understanding with the South Coast Air Quality Management District, the regional air quality agency, which permits their own trip reduction ordinance to supersede the SCAQMD Rule 1501 (formerly Regulation XV). The City TRO is more stringent in that it targets both morning and evening peak commute periods and has a lower employee threshold for regulated employers. Unlike the regional plan which only impacts employers with 100 or more employees at a worksite, the Santa Monica TRO requires all employers with as few as 50 employees per site to develop and implement a trip reduction plan. Employers with 10 to 49 employees are required to provide employees with information about ridesharing and other available transportation alternatives. The Santa Monica TRO is one of only two such ordinances which has been approved by the SCAQMD to supersede its own regulation.

Transportation Impact Fee

Employers pay an annual transportation impact fee, calculated according to the number of employees, to pay for the costs of administration and enforcement of the trip reduction ordinance. Employers who achieve the target average vehicle ridership (AVR) of 1.5 receive a

reduction in their annual impact fee. A developer impact fee to fund transportation improvements has been approved in concept by the Santa Monica City Council and is currently under study.

Transportation Management Association

In 1994, the City of Santa Monica reached an agreement with the Century City West Side TMA to provide its services in Santa Monica. This partly reflects the recognition that smaller employers subject to the TRO might have more difficulty than larger employers in implementing their individual worksite trip reduction plans, and could greatly benefit from membership in a TMA. Employers who join the TMA receive a twenty-five percent reduction in the annual impact fee. The TMA provides a variety of support services, including:

- rideshare matching
- trip reduction consultation
- a guaranteed ride home program
- vanpool formation, and
- a commuter discount program.

In addition to assistance from the TMA, employers can also access City of Santa Monica Transportation Program staff for help in developing their worksite trip reduction plans.

Private Sector Efforts

The development community and local Chamber of Commerce have cooperated with the City in the development of its Transportation Management Program. Rather than having to carry out a prescribed set of TDM measures, employers have been given the flexibility to choose among a variety of methods for achieving the target 1.5 AVR.

Measures of Effectiveness

The Santa Monica TRO goal is to achieve a citywide commuter average vehicle ridership (AVR) of 1.5 in three years. City-wide employer survey data for employers with 100 or more employees indicate that the TRO ordinance is having the desired effect. The current AVR (adjusted downward from raw data to account for survey non-response) for the am peak period is 1.34, compared to a pre-ordinance AVR of 1.29. Current (1994) city-wide mode split data for employees at large businesses (those with 100 or more employees) are as follows:

Mode	Percentage
Drive Alone (incl. Motorcycle)	60%
Carpool (2 or more)	26%
Vanpool (7 or more)	2%
Public Transit	6%
Walk	3%
Bike	2%
Telecommute	1%

It should be remembered that the data presented here are for the entire City of Santa Monica, and do not focus exclusively on the downtown core. Anecdotal evidence suggests, however, that the AVR for the downtown core is higher than the city-wide average. For instance, the Civic Center reported an AVR of 1.54 for both peak periods, indicating that it already meets the citywide AVR target of 1.50. Such results are encouraging and show a high level of TDM support on the part of the City, and an equally significant effort on the part of employers.

Public/Private Financing and Management

The City's primary objectives for the downtown area are to stimulate private reinvestment and increase business activity on the Mall and the surrounding street frontages. To accomplish this, the City undertook three significant activities:

1. Establishment of the Third Street Development Corporation (TSDC) to plan, implement, and sustain revitalization goals;
2. Organization of a new Assessment District based on benefit received from parking, mall and peripheral street improvements; and
3. Creation of an Architectural Design Review Board.

By entering into a multi-year agreement with the City, the TSDC carries out key aspects of the project and program management of the Third Street Specific Plan, including funding, marketing and advertising, property management, business promotion, and events and retail attraction for the downtown.

At the same time that the TSDC was established, a public improvements program was developed that included an implementation phasing and cost plan, public financing recommendations, and clear statements of the City's and the TSDC's responsibilities. The public improvements targeted re-design of the existing Mall, alleys, public open space, landscaping, and parking structure improvements. The phasing plan strategically constructed public improvements early on as inducements to the rehabilitation of private properties.

The public financing recommendations emphasized:

- Establishing a new "Mall/Downtown Improvements and Parking Assessment District";
- Leasing mall spaces for commercial revenues;
- Pledging current and incremental General Fund revenues to the operations and maintenance of off-street parking structures;
- Committing existing Santa Monica Place Redevelopment Project tax increments as annual debt coverage reserves;
- Creating a new redevelopment project for the mall which will be funded by future tax increments from individual private improvements; and
- Selling and leasing back existing parking structures in order to secure new debt.

Capital costs for new improvements and the retirement of existing parking structure debts were covered by a bond issue. A new Assessment District with higher assessments was required. New assessments were based on a direct benefit formula for tenants and owners. The benefits were based upon parking improvements and the degree of benefit of mall and street improvements.

The retirement of the existing parking structure debt relieved the City of parking management restrictions imposed 20 years ago. This allows for increased revenue potential to cover operations and maintenance costs, including:

1. Parking permit sales;
2. Parking lease revenues;
3. Lease revenues for retail space to be constructed within the parking structures;
4. Initiation of a \$.50 per half hour share up to maximum of \$4.00 for public parking spaces, after an initial 2 hours free.

Operations, maintenance, and event planning costs are to be covered by:

1. Leasing up to 15% of the mall public space for commercial uses, such as outdoor cafes; and
2. Use of General Funds, until new revenues from Mall business activities are available.

Finally, the Architectural Design Review Board was formed to review proposed designs for new buildings or buildings renovations. This appointed panel of architects and citizens has the responsibility to review and approve new structures in both the Bayside District and the Civic Center.

Current Problems and Opportunities

Both the Bayside Specific Plan and the Civic Center Specific Plan were developed to address the shortcomings of previous planning efforts. These two documents are, in essence, "mid-course corrections" to efforts that are already considered highly successful. Due to the recent economic recession in the Los Angeles area, many of the initial recommendations of these two plans have not yet been implemented.

Bayside Specific Plan

The 1992 Draft Bayside Specific Plan reevaluates and redirects the Third Street Specific Plan. It emphasizes expansion of the revitalization area, adding more retail services, providing additional incentives for housing, building a retail anchor at the north end of the Mall, and encouraging passageway linkages from public parking structures to the Promenade.

The Specific Plan includes a well-defined series of design guidelines which encourage maintenance of the District's character, improvement of the aesthetics, security of the alleys, and construction of additional streetscape improvements (signage, lamps, benches, etc.) along adjacent shopping streets.

Civic Center Specific Plan

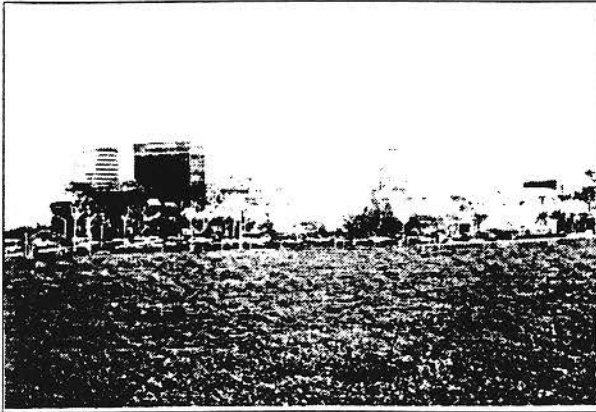
The construction of the Santa Monica Freeway in 1965 severely reduced the linkage between the downtown and the Civic Center. The original fine-grain, walkable block pattern no longer exists in the Civic Center area which now consists of two large superblocks. However, the recently adopted Civic Center Specific Plan includes measures to provide better walking connections between the city's major government and employment center and the downtown, as well as introduction of new intensive office and retail uses.

Conclusions

The conditions Santa Monica faced are not unique – a declining downtown, urban flight, and intrusive regional infrastructure projects – but, their response was innovative. Downtown has been able to overcome these forces by being flexible in their response to changing conditions. Throughout their efforts, the City has continually worked to modify policies to address emerging trends. They have worked with property owners and business leaders to tailor plans to local conditions. This drive to keep current and locally-specific has allowed the community to create a vital working center in that maintains its historic roots.

Case Study #4: South Coast Metro, Costa Mesa, California

Introduction



South Coast Metro's success in achieving marginally higher transit use and pedestrian activity is an example of how regional air quality and congestion management policies can encourage private interests to mitigate the impacts of their developments. South Coast Metro does not, however, represent a model of exemplary land use and urban design. While the site includes a mix of land uses, they are arranged in a way that discourages trip linking or walking. Thus, the successes that have occurred at South Coast Metro are primarily the result of transportation and air quality management programs.

Site Description

The City of Costa Mesa is located in Orange County, California, and lies 3.2 kilometers (two miles) from the Pacific Ocean and 1.6 kilometers (one mile) from John Wayne Airport. South Coast Metro, which is located along the

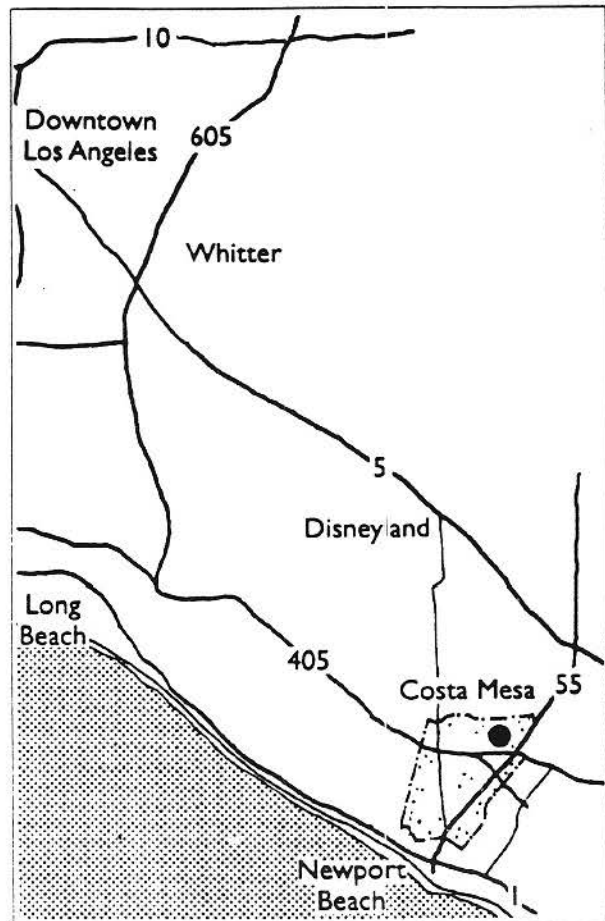


Figure 58: South Coast Plaza is located in the City of Costa Mesa, southeast of Long Beach.

northern boundary of Costa Mesa, is a mixed-use master planned development consisting primarily of office and retail uses, but also includes a significant civic/cultural component, as well as high density housing.

Over time, South Coast Metro has become the de facto downtown of Costa Mesa. South Coast Plaza and Crystal Court, two up-scale regional

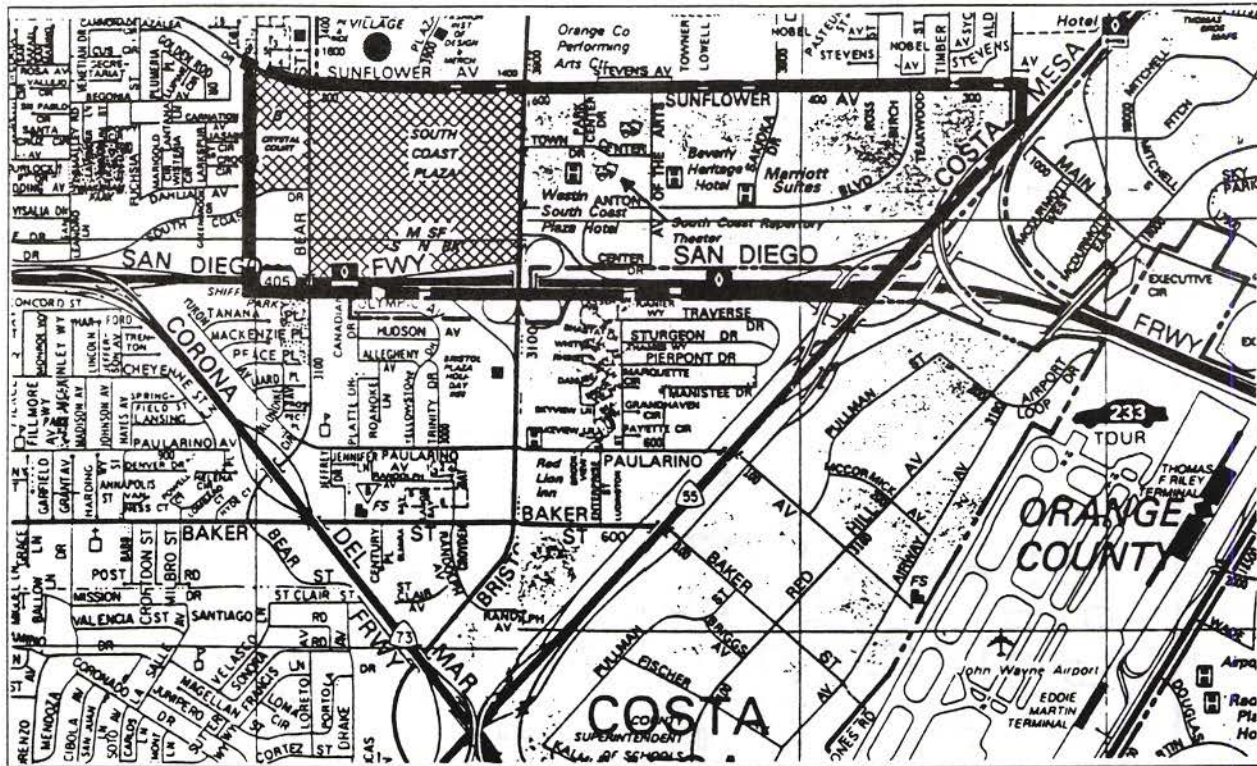


Figure 59: Proximity to a number of regional freeways and the Orange County Airport are strategic locational advantages for South Coast Metro.

malls with a total of 270,000 square meters (2.9 million square feet) of leasable space, draw patrons from the greater Orange County community. In addition to several national anchor tenants (Sax Fifth Ave., Nordstroms, Bullocks, Robinson May, Barneys, Sears, and Penney's), the two malls also include a number of restaurants and food courts that serve as lunch spots for nearby business people.

Perhaps the most interesting feature of South Coast Metro is its emphasis on cultural and civic amenities. The heart of the area contains a performing arts center, a repertory theater, several cinemas, hotels, and public parks and plazas. This complex has a proximate relationship with the nearby shopping malls and has helped to create the image of South Coast

Metro as the premier entertainment and shopping district within Orange County.

Surrounding the shopping centers and civic core are a number of high-rise office towers that provide over 325,000 square meters (3.5 million square feet) of space and over 11,600 employees. Following the model of many new office parks throughout the country, the office towers of South Coast Metro are designed as a series of "monument buildings" set in superblocks. Few pedestrian-oriented streets provide connections between development sites and each building is designed as a unique statement, rather than fitting within an urban fabric. At the edge of the site are a number of high density condominium complexes with a total of 770 units.

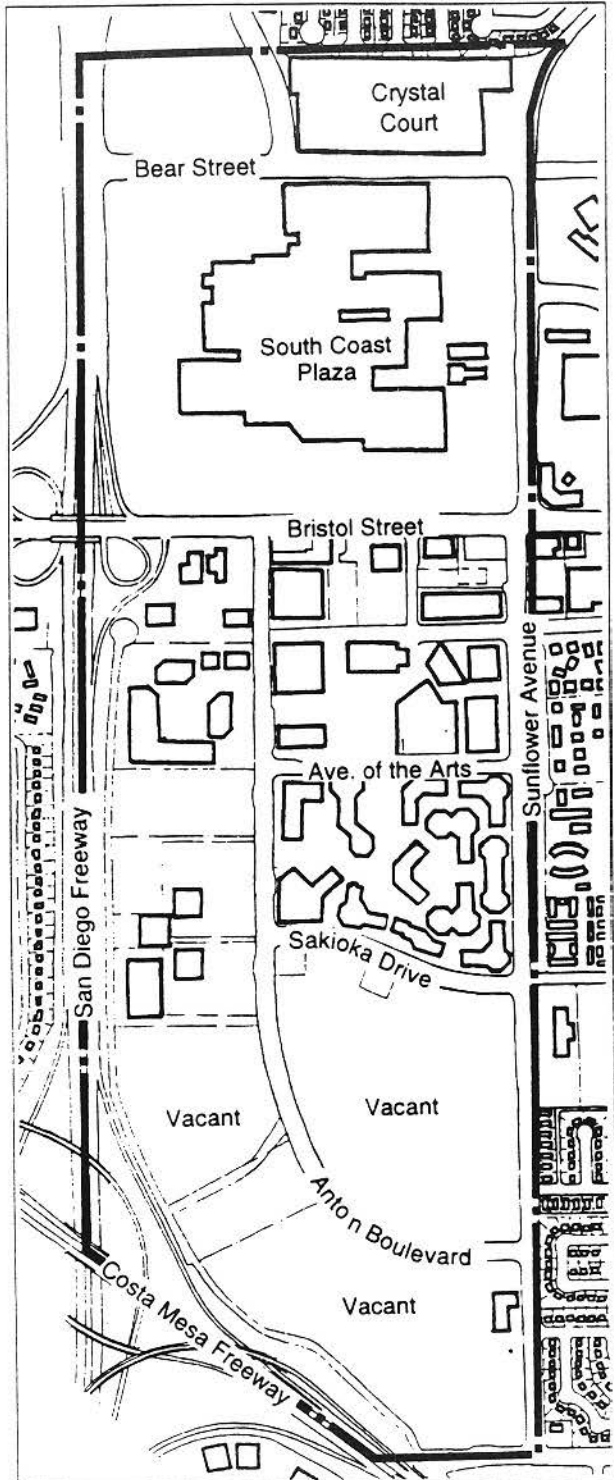


Figure 60: South Coast Metro is built on a "superblock" pattern of streets and blocks. This limits the ability of pedestrians to move easily through the area.

South Coast Metro is located at the junction of two major freeways: I-405 (San Diego Freeway) which runs east-west and provides access to most of the Los Angeles area, and SR-55 (Costa Mesa Freeway) which runs north-south within Orange County. In addition, SR-73 (Corona del Mar Freeway), which serves the southern portion of Orange County, connects with I-405 at the western border of South Coast Metro. This network of freeways give South Coast Metro the regional accessibility that has been a critical factor in its development.

The local roadway system in South Coast Metro is designed to efficiently accommodate large traffic flows. The area is served by three major arterials: Bear Street, Bristol Street, and Sunflower Avenue. These are six-lane arterials usually widened at intersections to provide for left and right turn bays. In 1993, the most heavily used arterial in the area (Bristol Street between Anton Boulevard and I-405) handled 69,500 daily vehicles. About 40% of the traffic in Costa Mesa is through traffic (traffic that neither originates nor is destined to the city).

Buildings in the core of South Coast Metro are connected by a network of pedestrian paths separated from auto traffic. The network stretches from the Orange County Performing Arts Center to South Coast Plaza, crossing a 1.2 hectare (3 acre) park located between the Westin Hotel and the Imperial Bank Tower.

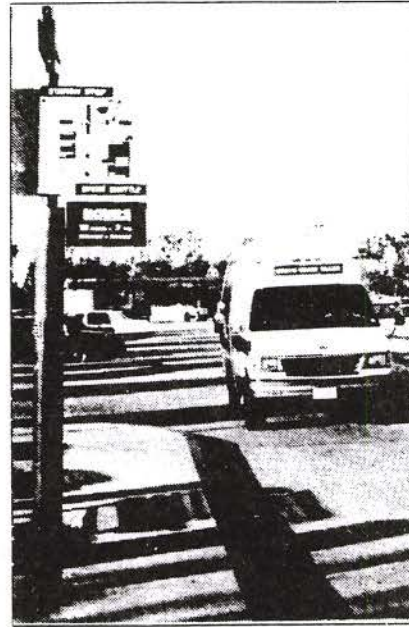
The pedestrian network ties into the Mall entrance through a long pedestrian bridge over Bristol Avenue and the Mall parking lot. Many employees cross the bridge during lunch time to access the mall's food courts. This direct pedestrian connection helps to reduce the number of mid-day vehicle trips from the employees of the area. The bridge was actually

built as a traffic mitigation measure by the South Coast Plaza shopping center developer, in order to eliminate pedestrian crossings at an already fully mitigated intersection (Bristol St./Anton Blvd., which has a triple left turn lane on eastbound Anton). The remaining portions of South Coast Metro also have good pedestrian amenities, although they are not used as intensively. The residential complex *The Lakes of South Coast* offers a good pedestrian pathway to adjacent office towers.

As for bicycles, the City of Costa Mesa adopted a Bikeway Master Plan in 1974, specifying a network of bicycle connections and design standards. The plan resulted in the implementation of several bike lanes in South Coast Metro, along Sunflower Avenue, South Coast Drive, Bear Street, and Avenue of the Arts. A multi-use trail is also present on the undeveloped portion of Anton Avenue.

The Orange County Transit Authority has expanded service to South Coast Metro, as the area developed. There are now 8 bus routes providing local service, and 2 express routes. Bus stops are located along the major streets and are provided with shelters and benches. There is no central transit hub, but all transfers can be made at the Bristol St./Sunflower Ave. intersection. The South Coast Plaza Mall provides a free shuttle between several entrances of the South Coast Plaza Mall, Crystal Court, and the Village. The shuttle runs daily from 12 noon to 7 p.m., with a 10-minute headway. Operating costs are paid by the mall.

There is one park-and-ride facility in South Coast Metro: CalTrans leases 50 parking stalls on a new parking garage built for the Crystal Court Mall. This is intended to help commuters combine shopping trips with their commute.



Travel Behavior

Commute Mode Split

Given the prominence of single-occupant vehicle travel in South Coast Metro, it is difficult to present this location as being exemplary. Table 6 presents the commute mode split for both residents and employees in South Coast Metro.

Residents of the area have a strong dependency on single occupant vehicles for work trips: about 80% of them drive alone to work, a proportion which remained constant through the '80s. Carpool accounted for 10% of the commuters in 1980 and is now down to 8%. Transit services, which were not provided in the area in 1980, have been able to capture only a meager 0.6% of the commute market. Despite the concentration of uses and the implementation of transportation demand management programs, South Coast Metro

residents drive alone to work in a higher proportion than residents of the metropolitan area as a whole (Anaheim/Santa Ana Metropolitan Statistical Area).

This high proportion of SOV commuting applies also for people who both live and work in South Coast Metro: an 80% drive alone mode share was observed for intra-SAC work trips from three sampled residential complexes in the study area.

The only positive impact of the development in South Coast Metro in terms of reducing SOV travel was a small increase in the proportion of residents walking to work in the '80s, from 1.8% to 3.1%, while this number slightly declined in

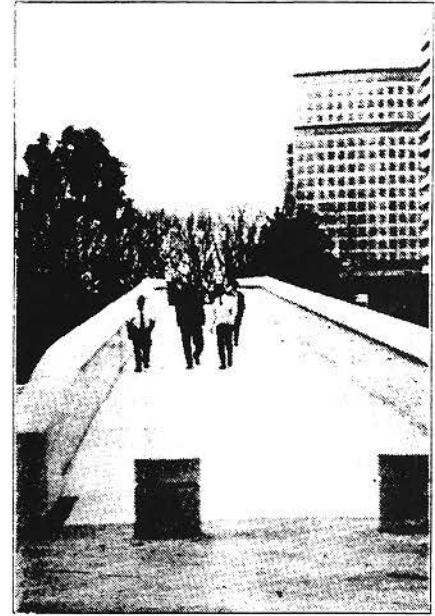


Table 6
Comparative Mode Splits
South Coast Metro Activity Center

Travel Mode	Prior to Major Dev.		After Major Development					
	Residents (1)		Major employers (100+ empl.) (2)				Residents (3)	
	Site	Region	Site				Site	Region
			Office	Retail	Services	TOTAL		
Drive Alone	80.6%	74.8%	82.3%	73.7%	43.5%	74.9%	80.0%	76.8%
Carpool/Vanpool	10.4%	16.1%	14.6%	19.8%	35.3%	18.9%	8.4%	13.7%
Transit	0.0%	2.1%	0.9%	3.7%	14.1%	3.4%	0.6%	2.5%
Walk	1.8%	2.5%	1.6%	1.6%	2.3%	1.6%	3.1%	2.2%
Bicycle	-	-	0.1%	0.4%	3.5%	0.5%	0.8%	0.9%
Motorcycle	-	-	0.0%	0.8%	1.3%	0.5%	0.0%	0.5%
Worked at home	3.1%	1.4%	0.5%	0.0%	0.0%	0.2%	5.5%	2.7%
Other	4.1%	3.1%	-	-	-	-	1.6%	0.7%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sources:

- (1) 1980 Journey-to-Work Census data
- (2) Employee Commuter Surveys (1994), South Coast Air Quality Management District
- (3) 1990 Journey-to-Work Census data

the region as a whole. South Coast Metro now has a higher share of pedestrian commute than the rest of the metropolitan area, which was not the case in 1980. There is also a non-negligible percentage of residents in the area who work at home (5.5%), which makes telecommuting the third most important form of commuting for South Coast Metro residents.

South Coast Metro employees similarly drive alone to work in high proportion, up to 86% for office buildings. Large employers are performing somewhat better, because of the programs in place to meet the mandatory AVR target of Regulation XV. The smaller proportion of SOV commuting found among the service employees can be explained by the large number of low-income hotel workers. The Westin Hotel is actually the only employer in the area which meets the 1.50 AVR goal.

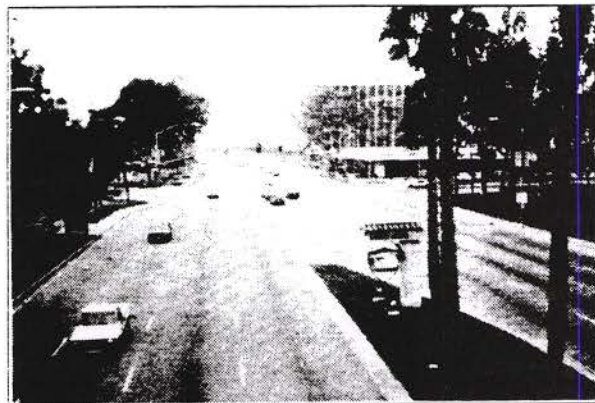
Shopping Trips Mode Split

The vast majority of mid-day shopping trips to South Coast Metro retail sites are made by automobile: 96% in the South Coast Plaza Mall, 97% at Crystal Court, and 95% at the Village. Similar percentages are obtained during the p.m. peak hour. Transit accounts for one percent or less of total trips.

Automobile Trip Generation

Peak hour automobile trip generation rates are available for office, retail, residential, and hotel sites in South Coast Metro.

Office trip generation rates for South Coast Metro are lower than the national average when measured relative to the building square footage, but are higher than average when related to the number of employees. This is



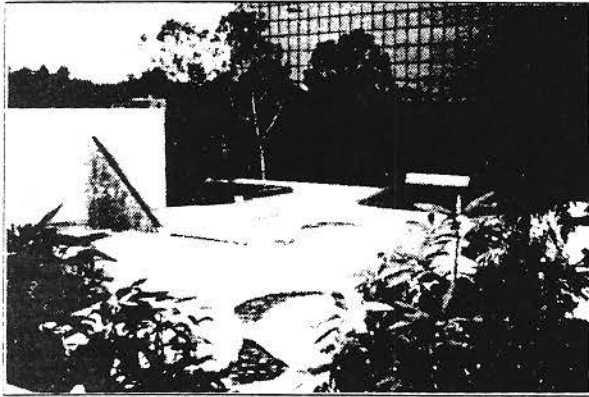
because South Coast Metro, like most suburban activity centers, has a lower density of employee per 93 square meters (1,000 square feet) than the national average. When based on employees, trip rates are actually higher than average, which would be expected given the high automobile use in the area.

Evening peak rates are also available for retail sites in South Coast Metro. Trip rates per occupied gross leasable area are lower than ITE's by 43% at the South Coast Plaza Mall, by 62% at Crystal Court, and by 24% at The Village. As for office buildings, the lower trip rates mostly reflect the lower commercial density in South Coast Metro as compared with the national average. Peak hour automobile rates are also available for two hotels in South Coast Metro. Trip rates per occupied rooms are lower than ITE's for each hotels during both peak periods, from as much as 34% in the morning and 67% in the afternoon peak. The small number of vehicle trips generated at South Coast Metro's hotels is partly due to the large amount of office space located within walking distance.

Residential peak hour trip rate in South Coast Metro are available for three residential complexes including high-rise luxury apartments, low-rise apartments, and low-rise

townhouse. In each of these categories, trip rates were found to be not significantly different from ITE rates.

Keys to Success Private-Sector Initiated Development



The land use and built form of South Coast Metro is fundamentally a result of private-sector initiative. The two major property owners, the Segerstrom and Sakioka families, have controlled the property since the land was farmed. Once development began encroaching on the area, they began to sell off parcels for urban development.

The first project developed on the site was the South Coast Plaza shopping center. It was, in fact, built before the area was served by the interstate freeway system and was considered something of a pioneer. Since that time, the property owners have undertaken a number of commercial, office, residential, and civic projects that now utilize roughly 90% of the site.

The long term ownership of the properties by the Segerstroms and Sakiokas has proved to be a significant benefit for the ultimate development of South Coast Metro. Their prominence and historic ties to Costa Mesa served as impetus for demonstrating their commitment to the community.

The Segerstrom family in particular, has taken their "civic duty" seriously. They initiated and executed the concept of creating a cultural center for Orange County on their property. The family was instrumental in the development of the Orange County Performing Arts Center, as well as enticing a variety of other entertainment-oriented cultural facilities to the area. The Segerstroms have also worked hard to entice high visibility tenants to the office complex, requiring signature architecture and landscaping. One of area's the most publicized features is a sculpture garden designed by the famous artist Noguchi. Called the "California Scenario," the sculpture garden is set in the courtyard of two high-rise office towers and has now become a popular destination for visitors and office workers. Many paths throughout the office complex ultimately lead to this important amenity.

Planning for the area has consisted of a number of General Plan amendments, zoning changes, Environmental Impact Reports, and development agreements generated through development applications submitted by the two major property owners. A detailed public vision for the area has not been established through a specific plan or other pro-active planning tool, rather, the City of Costa Mesa has been content to serve as a reviewer of applications.

Shared Parking Program

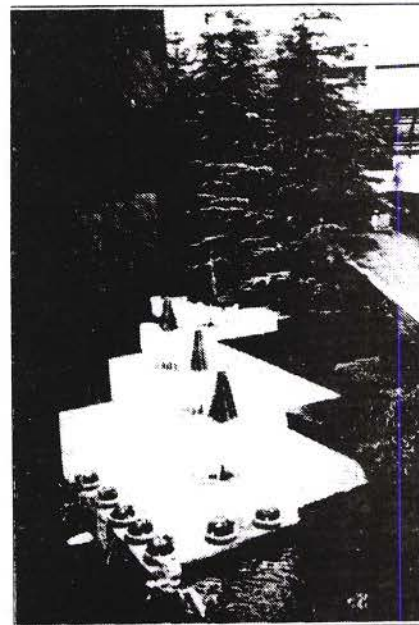
Rather than constraining parking supply, the City has chosen to rely on a shared parking incentive program as a method to encourage car and vanpooling. Parking in South Coast Metro is abundant and usually free of charge for employees. It is generally located in structures or gated lots.

The parking requirements for all uses are calculated as a whole, using an innovative method which accounts very precisely for the different daily and weekly peaking characteristics of each type of land use. This allows important reductions in parking requirements in South Coast Metro, where offices (peaking in the middle of weekdays) and theaters and cinemas (peaking on weekend evenings) share the same parking structures.

The shopping malls have large amounts of parking, in both surface lots and parking garages. South Coast Plaza actually has more parking than needed because major tenants require a certain amount of parking stalls in the immediate vicinity of their stores. The large parking lot of South Coast Plaza is gated in the morning to prevent employees of the area from using it for the day. The gates are removed at ten o'clock, with the opening of the mall.

Development Phasing and Performance Monitoring Program

At the citywide level, the City of Costa Mesa conducts a Development Phasing and Performance Monitoring Program which evaluates the cumulative impacts of new development on the roadway system. The program ensures that infrastructure is added as development proceeds so that the established



level of service standard (LOS D) is maintained throughout the City. Specifically, the program tracks land use developments and monitors highway traffic volumes and intersection level of service. The program was developed to meet the funding eligibility requirement of County Measure M, which raises money from a gas tax and makes it available for transportation improvements.

At the local level, projects requesting approval from the City must pay a one-time traffic impact fee based on the number of trips generated, as calculated by standard ITE rates. In addition, project generating more than 100 peak hour trips or expected to affect already congested intersections are required to submit a traffic impact study and fund mitigation measures as part of their approval process.

In South Coast Metro, it was found that the roadway system would not have the capacity to accommodate the proposed buildout development. Following three transportation studies, a set of freeway and local arterial

improvements were developed to provide the capacity needed to handle the projected growth. These improvements, which include two new streets and four new freeway ramps, have been incorporated in the Master Plan of Highways.

Extensive Public/Private Transportation Demand Management Program

South Coast Metro is served by a number of cooperative TDM efforts initiated and supported by both the public and private sectors. Throughout the 1980s, the two cities of Costa Mesa and Santa Ana, the Orange County Transportation Authority (OCTA), the development community, and major employers shared a growing concern about increasing traffic congestion. In 1987 a regional air quality regulation added an additional impetus to TDM programs beyond the need created by the worsening traffic situation. This led to the formation of a TMA in 1988, the construction of HOV lanes on major freeways serving South Coast Metro, and the evolution of South Coast Metro into a major transit transfer point. Currently, TDM activities remain an important component in the ongoing effort to maintain the economic viability and overall quality of life in South Coast Metro. The organizational framework supporting those activities, however, is being modified in response to changes in both local and regional conditions.

TDM Ordinances

In 1991 the City of Costa Mesa adopted a TDM ordinance requiring that new major developments provide facilities that support alternatives to single-occupant vehicles. The ordinance is designed to reduce the number of peak-period vehicle trips generated by new developments or the expansion of existing

facilities. It includes requirements that at least 15% of employee parking spaces be reserved and designated for carpool vehicles, that bicycle parking facilities be provided along with shower and locker facilities, that a commuter information area be provided to offer employees information on available transportation alternatives, and that facilities be designed to accommodate rideshare vehicle loading areas, and assure vanpool vehicle accessibility. The ordinance also permits developers to reduce the total number of employee parking spaces for each additional carpool or vanpool space or bicycle parking and shower/locker facility in excess of the number required by the ordinance.

Transit Service Improvements

South Coast Metro has become a major transit transfer site with 10 OCTA routes providing local and express bus service. A recent expansion of the shopping center included a multilevel parking garage, the top floor of which was reserved for park-and-ride. This largely serves commuters traveling to other work destinations, but also enables transit riders to combine work and shopping in a single trip. All new developments within South Coast Metro involve consultation between the respective cities and the OCTA to determine what improvements such as bus shelters and turnouts are needed.

HOV Lanes

The two major freeways serving South Coast Metro, the San Diego (I-405) and Newport/Costa Mesa (SR55) possess HOV lanes for carpools, vanpools and buses. There are HOV bypass lanes on most freeway on-ramps. The OCTA is planning direct HOV lane only ramps between the 55 and 405 freeways.

Trip Fee Programs

As mentioned above, the Master Highway Plan adopted by the cities of Costa Mesa and Santa Ana levies traffic impact fees that are applied to all new construction or expansion of existing developments. They are one-time only fees based on standard ITE rates for commercial sites.

Air Quality Requirements

Employers in South Coast Metro with 100 or more employees at any site are subject to the South Coast Air Quality Management District Regulation XV, the nation's first mandatory trip reduction regulation tied to air quality attainment. These employers have been required to develop and implement a trip reduction plan designed to achieve the target average vehicle occupancy of 1.5 during the morning peak period. Although there are several major employers within South Coast Metro, the majority of employers are smaller professional service firms which are not subject to the regulation. Currently, Regulation XV is being revised to give employers alternatives to the development of trip reduction plans. These alternatives may include measuring emissions of employee vehicles, vehicle trade-in programs, and other methods for reducing vehicle emissions. The impact of these proposed regulatory changes on current employer TDM efforts is not yet known.

Additional Policies Supportive of TDM

South Coast Metro was planned as a high-density, mixed-use development. Shared parking arrangements were included to reduce the overall parking supply by shared use of office and retail/entertainment uses. This created

an incentive for an area-wide TDM program. In addition, the City of Costa Mesa has an innovative housing ordinance, placing requirements on large developments, like South Coast Metro. It requires housing, either on-site or within city limits, to serve at least 20% of the project's workforce. This has prompted South Coast Metro developers to build multi-family units within the boundaries of the center which should encourage greater transit and pedestrian commuting.

The South Coast Metro Transportation Management Association

The TMA formed in 1988 resulted from the collective effort of the Orange County Transportation Authority, the South Coast Metro Alliance (representing property owners), and the Executive Council (representing major employers within South Coast Metro). The TMA provides assistance with trip reduction plan preparation to help employers comply with SCAQMD Regulation XV, guaranteed ride home programs, commuter matching services, shuttle services, bus pass distribution, networking for employee transportation coordinators and other related services. The TMA played an integral role in creating the park-and-ride facility mentioned previously. OCTA helped to form and support the TMA with the expectation that the private sector would become the sole financial support after three years. At that point OCTA did discontinue its funding but the TMA was still being funded by the Alliance and the major employers.

The South Coast Metro Alliance

Currently, the TMA is now serving approximately 10 of the major employers located in South Coast Metro. However, the

developers and property owners which make up the Alliance have established an independent transportation management program to serve the tenants of their buildings which constitute the bulk of the employee population. The goal is to develop site-specific trip reduction programs for each of the major buildings in South Coast Metro. This innovative TDM program will become an integral part of the Alliance's marketing efforts for South Coast Metro. In addition, the Alliance will work closely with government agencies to promote transportation improvements such as additional shuttle express lines.

Current Problems and Issues

Auto-Oriented Pattern and Poor Pedestrian Environment

Perhaps the most obvious shortcoming of South Coast Metro is its physical pattern. While the site clearly demonstrates a number of features considered important in creating a suburban activity center that minimizes single occupancy vehicle travel – mixed-use, high intensity, entertainment and nighttime activities, and transit – it fails to create an environment that encourages walking and trip linking. This is, in part, due to its campus-style superblock street pattern. Because each “pod” of development has very few internal street connections and is surrounded by large arterials, walking between uses is made more difficult. The reliance on pedestrian bridges to cross major streets clearly demonstrates this point. Without the bridges, most people drove from one destination to another in order to avoid crossing heavily trafficked streets; with the bridges, they continue to drive because the distances are excessively long.

A second shortcoming of the physical pattern at South Coast Metro is the configuration of land uses. The concentration of development is placed in a 3.2-kilometer (two-mile) long band between a freeway and a major thoroughfare (Sunflower Avenue). Distances between the residential nodes and the office and civic areas can be up to 2.4 kilometers (1.5 miles) – beyond a comfortable walking distance. Similarly, employees must walk up to 1.6 kilometers (one mile) to reach the nearest restaurant at lunchtime. Needless to say, the segregation of uses has made it necessary for both residents and employees to use their cars for most types of trips.

Conclusions

The lessons of South Coast Metro are useful for planners and developers, alike. Much of what has been accomplished here is an extension of standard development practices being used throughout the country. While the City and regional agencies have established transportation and air quality management programs that seek to temper the use of automobiles, and the developers have provided a mix of uses, the physical pattern of development has limited the area's ability to truly become less reliant on the car.

Case Study #5: Kendall Square, Cambridge, Massachusetts

Introduction

The Kendall Square area was extensively redeveloped by the Cambridge Redevelopment Agency in the late 1960s as part of a larger urban renewal scheme for East Cambridge. Although slow to start, the area surrounding Kendall Square made a strong comeback in the late 1970s and early 1980s. Today, mixed-use development, with over 130,000 square meters (1.4 million square feet) of commercial and office space, is clustered within 400 meters (a quarter mile) of the Kendall Square subway stop. The site also boasts impressive travel behavior characteristics: over 20% of Kendall Square employees ride transit to work and an additional 24% walk or ride bicycles for their commute.

Site Description

Kendall Square lies in the neighborhood of East Cambridge within Cambridge, Massachusetts and is one of several employment and education centers within the city. The focus of this case study is a 9.7 hectare (24 acre) site located on the Massachusetts Bay Transit Authority (MBTA) Red Line at the Kendall Station. Called "Cambridge Center," the site is bounded by Binney, Main, and Third Streets and is crossed by Broadway and Sixth Streets; it is within one block of the Charles River. The study area is a part of a larger industrial zone which serves as a boundary for a well-established single-family residential neighborhood to the north (East

Cambridge) and the Massachusetts Institute of Technology (MIT) campus directly across the street to the south.

Cambridge Center is being developed by one master developer, Boston Properties. Today, the site includes 130,000 square meters (1.4 million square feet) of commercial and office development. Ultimately, the Master Plan allows for 251,000 square meters (2.7 million square feet) of space, as well as several high-rise residential towers. Site planning standards established by the City of Cambridge Redevelopment Authority, call for a coherent configuration of buildings, a strong relationship of buildings to streets, retail at the transit station, and public open spaces at both street and rooftop levels. These design requirements have been closely followed by the developers.



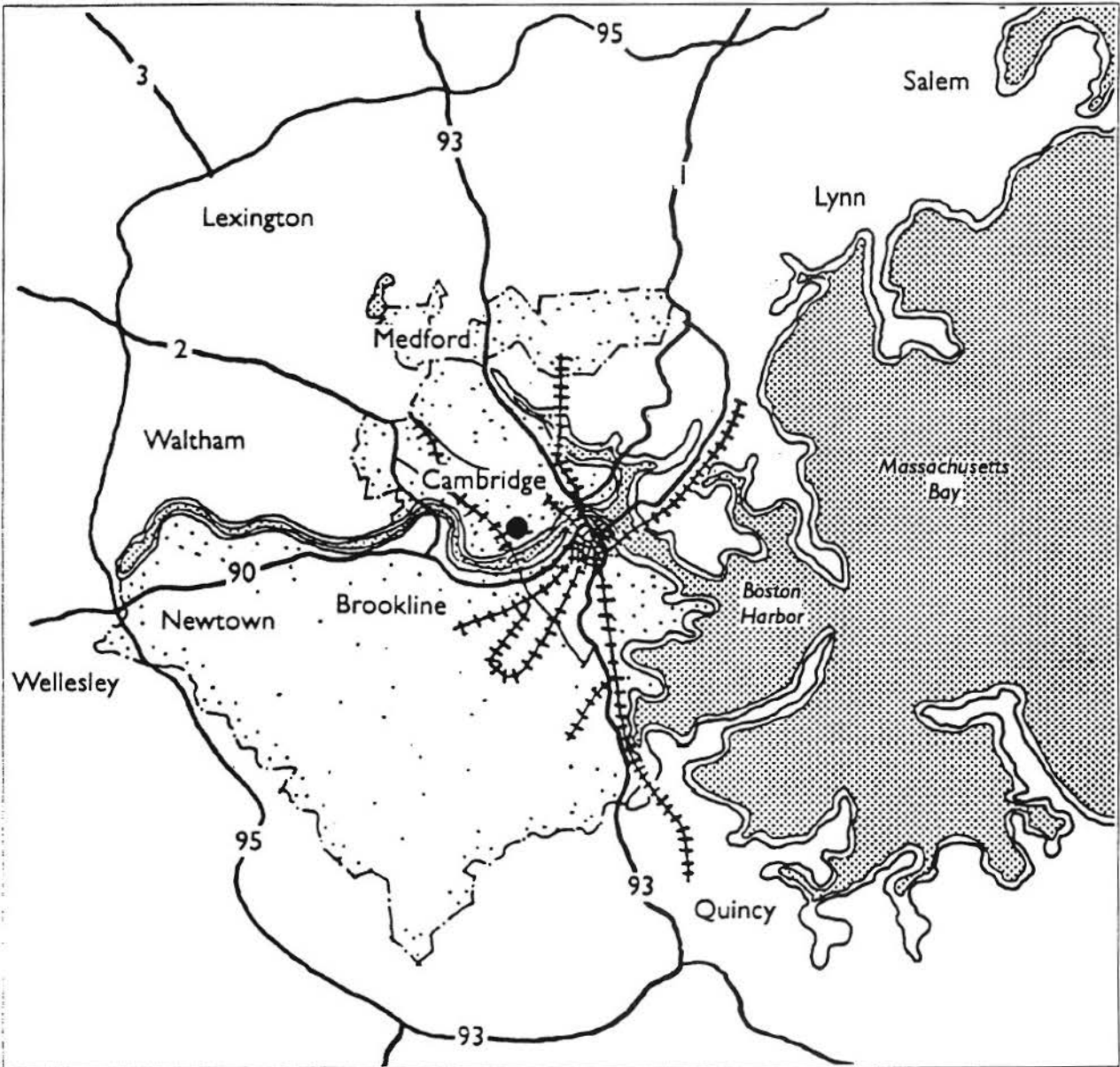


Figure 61: Kendall Square is located across the Charles River from Boston, within Cambridge.

Taking advantage of the site's proximity to MIT, the development in Cambridge Center includes a number of uses that have a symbiotic relationship with educational institutions. 111,500 square meters (1.2 million square feet) of first-class office space, in high-rise and mid-rise buildings, is concentrated in the triangular portion of the site between Main Street and

Broadway over the subway stop. Low-rise, two to six story buildings are located north of Broadway, providing space for research and development uses, laboratories, high-tech and biotechnology facilities, as well as first class office space. Ultimately housing will be built on a ten acre site west of the transit station. In addition, the development includes a 431 room

Marriott Hotel with a health club and conference facilities, over 14,000 square meters (150,000 square feet) of ground floor retail space and restaurants, a child/elder care facility, and a series of parks, plazas, and public open spaces. Two large parking garages serve the site, providing a total of 2,000 spaces. Additional spaces are provided in surface lots located on sites to be developed in the future.

Major tenants currently include:

- U.S. Department of Transportation
- Stride Rite Incorporated, corporate headquarters
- BioGen Incorporated, corporate headquarters and laboratories
- Open Software Foundation
- Whitehead Institute for Biomedical Research
- Computer Corporation of America
- Camp Dresser & McKee, world headquarters
- Hartford Insurance Company, regional headquarters.

While the most intensive uses are housed in newly constructed office buildings, some former warehouses were renovated and converted to office space. This mixing of old and new creates an interesting character and helps to soften the "sterile" atmosphere of the predominately modernistic new buildings. Similarly, special paving on crosswalks and sidewalks, public plazas and parks, street trees, and public art all help create a comfortable walking environment.

The central element of the transit system in the study area is the Kendall Square/MIT station on the MBTA Red Line. The Red Line, the most patronized of the four subway lines in Boston, places Kendall Square a short five minute ride from either downtown Boston or central

Cambridge. The Kendall Square/MIT station, which was underutilized before redevelopment of the area, has been modernized as part of the construction of Cambridge Center. The reconstruction included increasing the capacity of the platform and establishing a direct connection into the complex.

In addition to rail transit service, three MBTA bus lines serve Kendall Square: one provides regular service to the western part of Boston, one provides weekday service to the northwest suburbs, and the last one is a newly established express cross-town service (on weekdays only) to the western part of Boston. No direct bus service is provided from Kendall Square to the northern and the western suburban areas of Boston, although provision of this service is now being contemplated.

The success of Kendall Square demonstrated that older industrial areas could be transformed to more modern, mixed-use developments, particularly if they were accessible to transit. Thus, in 1978, the City began working on a plan to revitalize the East Cambridge Riverfront. By 1990, development around the Lechmere Station began to take off. Located roughly 10 blocks to the northeast of Kendall Square, along the Green Line, this area faces the riverfront and establishes the eastern edge of the East Cambridge neighborhood. Development here consists of over 372,000 square meters (4 million square feet) of commercial space, including Class A office space and the CambridgeSide Galleria, a regional shopping mall that caters to up-scale retail tenants, as well as over 1,000 units of high density housing.

The two areas, Kendall Square and Lechmere Station, seem to be mutually supportive. "The Wave," a privately sponsored shuttle,



Figure 62: Kendall Square is close to two subway stations: the Kendall Square Station, which is on the site and links to the Red Line, and the new Lechmere Station, which is on the Green Line and adjacent to the Cambridge Site Galleria.

operates between Kendall Square and the CambridgeSide Galleria Shopping Center. It was established as a traffic mitigation measure for the CambridgeSide development and has been extremely successful. Patronage has grown steadily in the last four years and is now averaging almost 60,000 passengers per month. Shuttle service is provided free of charge from Monday through Saturday, with fifteen minute headways.

Future transit plans for the area call for the addition of a new cross-town bus route from Kendall Square to the Orange line to the north, an area that is currently underserved by transit. In the longer run, there are plans to use the abandoned Boston & Albany railroad right-of-way to provide for a circumferential fixed guideway transit route. The railroad right-of-

way borders the redevelopment area to the west and would provide excellent access to the Kendall Square area from the surrounding suburbs. Considerations have been given to light rail or to dedicated bus lanes with priority treatment at intersections, but no decision has been made yet.

Travel Behavior

Commute Mode Split

Table 7 presents the commute mode split for both residents and employees of the Kendall Square area. Only 35% of the residents of the area drive alone to work, a proportion that remained constant through the 1980s. About 30% of the residents commute by public transportation, a percentage that has also remained stable during the decade, in spite of a

Table 7
Comparative Mode Splits
Kendall Square Activity Center

Travel Mode	Prior to Redevelopment (1)		After Redevelopment		
	K. Sq./MIT	Region	Kendall Square/MIT		Region (3)
	Residents	Residents	Employees	Residents (3)	Residents
			Stride Rite (2)		
Drive Alone	34.5%	56.3%	58.2%	35.5%	65.8%
Carpool/Vanpool	12.9%	17.0%	-	5.5%	9.8%
Subway	11.6%	6.9%	30.2%	13.4%	7.4%
Train	-	-	4.0%	-	-
Bus	19.3%	8.5%	6.0%	17.1%	6.5%
All Transit	30.9%	15.4%	40.2%	30.5%	13.9%
Walk	19.8%	8.7%	1.0%	24.0%	6.5%
Bicycle	-	-	0.5%	3.7%	0.5%
Motorcycle	-	-	0.0%	0.0%	0.1%
Worked at home	1.9%	1.4%	0.0%	0.8%	2.6%
Other	0.0%	1.2%	-	0.0%	0.8%
	100.0%	100.0%	100.0%	100.0%	100.0%

Sources:

- (1) 1980 Journey-to-Work Census data.
- (2) Cambridge Redevelopment Authority, Stride Rite Corp., Associate Preference Survey, 1994.
- (3) 1990 Journey-to-Work Census data.

region-wide decline in the transit mode share. Among East Cambridge residents who use transit, subway usage has increased at the expense of bus ridership, a reflection of the extension of the MBTA subway network during the decade.

A substantial proportion of residents in the area walk to go to work (20% in 1980, up to 24% in 1990). Residents of the MIT/Kendall Square area have the lowest proportion of SOV usage among the six selected study areas.

This performance is attributable to several factors: the high density of the area, the fact that downtown Boston is located within walking and bicycling distance from Kendall Square, and the high number of MIT students who both live and work in the area.

The only employee commute survey available for MIT/Kendall Square was conducted at the Stride Rite Corporation headquarters, which are located at the core of the Cambridge Center complex. The majority (58%) of Stride Rite employees drive alone to work, although a significant portion (30%) use the MBTA Red Line.

Vehicular Trip Generation

The trip generation rates for the Cambridge Center Complex are 0.21 trips per employee in the morning peak period and 0.20 trips per employee in the p.m. peak. This corresponds to half of the ITE trip generation rates for general office buildings (0.44 in the morning and 0.39 in the afternoon).

Keys to Success

One important factor in Kendall Square's outstanding travel statistic seems to be its location. Not only is the site easily accessible from virtually the entire metropolitan area via transit, but it is closer to downtown Boston than many parts of Boston. This has been seen by a number of the area's tenants as a strategically important factor in their decision to locate in the area.

A second key factor is the tradition of the City of Cambridge and the Boston region as a whole to walk, use transit, or ride bicycles to work. (The Boston region as a whole has a very high percentage of people who walk, use transit, or ride bikes to work. The City of Cambridge has similarly high numbers.) In addition, the site is directly across the street from MIT and includes a number of businesses which employ professors and graduate students. This demographic group has a higher percentage of non-SOV travel than the general population.

However, the good fortune of location and the tradition of non-auto travel does not tell the whole story at Kendall Square. There are a number of planning policies, design features, and other decisions - made by the Redevelopment Authority, the developers, and their project designers, as well as the on site businesses - that have contributed to current travel behavior. These primary features are as follows.



Redevelopment Agency Initiative in the 1960s and 1970s

Kendall Square and the East Cambridge Riverfront were historically the heart of the city's industrial core. Numerous warehouses and port-related industries flanked the waterfront, providing the employment base for much of the city's residents, as well as an important component of the regional economy.

The city's population reached its peak in the 1950s and strong indicators of economic decline came to the forefront in the 1960s. Suburbanization caused a movement of not only residents, but industry as well. The loss of the long-time businesses in Kendall Square was devastating to the local economy putting a heavy tax burden on homeowners in the area. The only growth industry that was keeping Cambridge from sinking was education, primarily Harvard University and MIT.

With the decline of East Cambridge came the establishment of the Cambridge Redevelopment Authority. Their vision promoted "old neighborhoods being replaced by a new contemporary development pattern of more efficient land use in large buildings specifically designed to accommodate the automobile."

Their visions were made possible through zoning amendments and land acquisition and assembly.

Changes to the Zoning Ordinance "reflected the prevailing notion that higher densities were desirable as an incentive to redevelop the older neighborhoods through private renewal and, in part, to accommodate the expansionist vigor evident at least in the city's two major institutions of higher learning." Plans developed at that time demonstrate a modernist vision of vast high rise developments, free flowing traffic, and moving pedestrians off of streets and up onto grade separated walkways and roof gardens.

The revival strategy began with plans for selected declining industrial areas, specifically East Cambridge and Alewife. This strategy aimed at securing some of the subsidy and economic incentive programs offered by the federal government, as well as utilizing redevelopment powers to acquire underutilized land and assemble sites that were large enough to create significant development sites.

In the late 1960s, a 28 hectare (70 acre) parcel around the Kendall Square station was designated as an urban renewal area. The City of Cambridge entrusted the Cambridge Redevelopment Authority with the authority to develop a plan for the site and to manage its redevelopment. This plan was completed in 1977 and 9.7 hectares (24 acres) were acquired with the use of eminent domain powers. The Authority continues to supervise the progress of development today and is responsible for the installation of all of the public improvements.

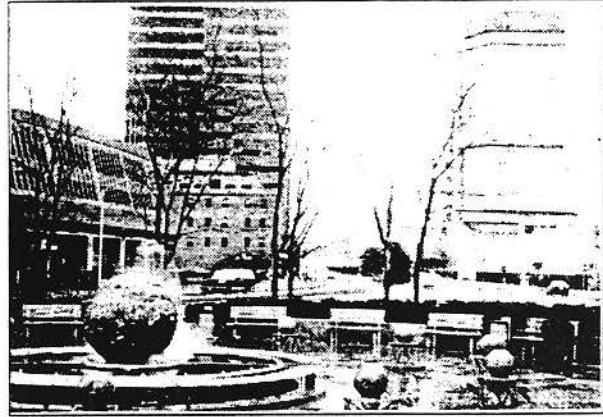
Developer Competition for Cambridge Center Development

A public competition was held in 1979 and Boston Properties was selected as the developer of Cambridge Center, the main component of the Kendall Square development area. Boston Properties prepared a master plan that fit within the guidelines established by the Redevelopment Authority and called for the creation of an employment node that was highly complementary with the education and research activities at MIT. They also hired nationally-recognized architects (Kohn Pederson & Fox Associates) to establish an architectural theme and design several of the first phase buildings.

The first major building was constructed in 1981 and building continued steadily until 1992. Even in the late '80s, when most office construction was at a standstill, building at the Kendall Square site continued. This is primarily a result of the developer only constructing buildings when commitments were secured from major tenants; very little office space was built on a speculative basis. Currently one half of the master plan is completed.

There are a number of elements incorporated into the master plan and subsequent development of Kendall Square that have fostered non-SOV travel. These include:

- **Proximity to the Transit Station** – All development at Kendall Square is within 400 meters (1,300 feet) of the transit station. Most of it has been concentrated into the triangular area at the southern edge of the site which it is within 183 meters (600 feet) of the station. This area was the first area to be built.



- **A Good System of Walkways** – Public walkways at Kendall square are generously sized, attractive and sheltered from the weather. Deep arcades line the facades of many of the buildings. Through block pedestrian ways that cut through interiors of buildings provide direct routes from the station to major destinations.
- **Limited Parking** – The number of spaces available in the area is limited (see below). The City has imposed a parking freeze preventing more parking from being provided.
- **No On-Street Parking** – None of the streets within the redevelopment area have on-street parking. Employees are encouraged to walk to do their errands and shopping. The convenience retail businesses there, some of which pre-date the redevelopment, continue to thrive with this arrangement.
- **Innovative Child/Senior Day Care** – One of the largest tenants at the complex - Stride Rite - runs a day care center in their space that offers facilities for both young children and elderly family members. The facility is set up to encourage older people to act as grandparents and teachers to the children.

Modified Circulation System

Kendall Square, a major entry point into Cambridge, is located at the point where all traffic between East Cambridge and downtown Boston converges. As a consequence, the area experiences substantial east-west through traffic. In addition, there is also significant north-south movement between MIT and the development around the Lechmere MBTA station.

The Cambridge Center redevelopment implemented a new circulation pattern for the area. All local streets were eliminated and a mid-block connector aligned with a local street outside the redevelopment area was added to provide access to the new development. The resulting new superblock pattern contrasts sharply with the character of the existing residential neighborhoods immediately to the north, which are built on a 61 by 122 meter (200 by 400 foot) fine grain grid pattern.

As part of the Cambridge Center project, a new arterial was constructed to allow north-south traffic to bypass Kendall Square; this new roadway features a continuous median intended to limit traffic diversion to residential streets. The original rotary at Kendall Square, which was one of the most dangerous intersections in Cambridge, was replaced by a park and a T-intersection. Broadway was emphasized as a major arterial to Boston and Main Street was downgraded, for all practical purposes, to an eastbound one-way street. Access to westbound Main Street was maintained only to allow buses and taxis to loop around the complex to load and unload passengers. All parking garages on Main and Broadway were designed to be accessed and egressed with right turns only.

Streets in the redevelopment area are wider than most streets in the rest of the city. Traffic operations are simplified by the absence of on-street parking, and, as a result, the levels of congestion during peak hour remain acceptable and below what is observed elsewhere.

The Redevelopment Authority has agreed to pursue an on-going program of traffic analysis to ensure that the traffic impacts of the project are consistent with the projections registered with the State Environmental Protection Agency. If the impacts are found to be higher, the Authority is required to implement additional traffic mitigation measures. The most recent counts showed that traffic volumes on all surrounding arterials are within the projections.



New Pedestrian and Bicycle Facilities

Pedestrian amenity guidelines for new projects in Cambridge Center have resulted in the creation of a good pedestrian network, especially in the immediate vicinity of the subway station. The Redevelopment Authority has negotiated a series of permanent easements which allow direct indoor pedestrian pathways linking Broadway, the Marriott hotel lobby, a food court, and the MBTA station. Sidewalks in the redevelopment area are wide and

embellished with pedestrian amenities. Pedestrian arcades have been constructed along building facades that face onto primary walking routes. A tree-lined pedestrian connection has replaced an abandoned local street, linking Cambridge Center with the residential neighborhood to the north.

To support the provision of pedestrian connections, the Mixed-Use (MXD) zoning category which applies to Cambridge Center allows the length of pedestrian way to be counted toward a reduction of open space requirements. The most costly pedestrian facilities (such as bridges) allow the largest reductions in open space requirements.

No bicycle paths exist in the Kendall Square area, although there is one along Memorial Drive which follows the Charles River one block south. Bicycle racks are provided on sidewalks and safe bicycle storage areas are included in parking garages. During the weekends, in the summer months, the City of Cambridge closes Memorial Drive to cars and reserves it for pedestrian use including bicyclists, skateboarders, and in-line skaters.

Plans are being considered to build a grade-separated pedestrian crossing over Broadway and through the hotel. This new pathway would connect the subway station with possible new development on the parcel located north of Cambridge Center (DOT).

Limited On-Site Parking

The Cambridge Center complex currently contains two parking garages and one surface lot. The garages have a total capacity of about 2,000 vehicles and serve as employee parking on a pooled basis for tenants of the surrounding buildings. (This is equivalent to roughly 1.4 parking spaces per 93 square meters (1,000 square feet) of office development.) Parking is provided to tenants under long-term leases and on a monthly or daily basis to tenants' employees. Employees are charged for parking but can obtain a 20% discount if they are carpooling or vanpooling. There is currently no constraint on the supply of parking, as the available capacity is larger than the total demand.

The Redevelopment Authority has agreed to minimize the demand for parking spaces by providing a Transportation Services Plan and other incentives for employees to ride transit, but the Cambridge Center development is exempt from constraining the parking supply to a point where it would conflict with the marketing of the project. The parking ceiling for the whole complex has been established at 4,300 spaces (equivalent to 1.6 spaces per 93 square meters (1,000 square feet) of office development). This constitutes a special exemption to the city-wide parking freeze. However, as a State EPA requirement, developers can not construct additional parking spaces without providing a Transportation Services Plan aimed at reducing SOV usage.

There is no on-street parking on most streets around Cambridge Center. This is primarily intended to reserve the lane capacity for moving traffic and is made possible by the absence of on-street retail on most streets of the area.

City-Wide Parking Program

The City of Cambridge has a policy to reduce automobile usage by constraining the supply of parking. Two city-wide policies are in place for that purpose:

1. **Parking Freeze** - To comply with the Federal Clean Air Act, the City of Cambridge has maintained, since 1973, a ceiling on the number of commercial parking spaces. Exempted from the freeze are public transportation garages, on-street parking, and residential parking lots. The total number of spaces, or ceiling, has been set, and the removal of spaces in one area places them in a parking bank, from which new developers can draw if the need arises. If, for instance, there were no spaces in the bank at a given time, a developer would be unable to construct new parking as part of a commercial project. Although the freeze has been controversial, it has remained in effect.
2. **Residential Parking Program** - Facing a serious parking problem in the beginning of the 1970s, the City of Cambridge implemented a residential parking program in 1972 that prohibits on-street parking to anybody but Cambridge residents. Originally implemented on a neighborhood basis, the program now allows residents to park anywhere in the city, as long as their vehicles are identified with a sticker. The pricing scheme of stickers is intended to discourage more than two vehicle registrations per household. The program has been successful in limiting car commuting from outside the city, and is also covering more than its costs with fine revenues.

City-Wide Vehicle Trip Reduction Ordinance

Partially in response to criticism raised in the controversy over the parking freeze, the City passed a Vehicle Trip Reduction Ordinance in 1992 that committed City employees to a vehicle trip reduction effort. This new program

demonstrated that the City:

- was willing, on its own, to explore other ways to reduce parking demand, aside from a parking freeze; and
- could provide an example that other employers and developers could follow when considering TDM programs on their own in the future.

The City initiated its compliance with the ordinance by instituting enhanced bicycle support throughout Cambridge. The on-going bicycle program includes installing new city-shared bicycle racks, making bicycles available to City employees for meetings and other work-related travel, and a stepped-up promotional campaign for bicycling in general, with a new Cambridge alternative transportation map.

The City recently completed a travel survey of all 3,500 of its municipal employees. The results of that survey will provide officials with a basis on which to begin its own program for employee vehicle trip reduction.

Privately Funded Shuttle

As mentioned above, the developer of the new regional shopping mall, Cambridge Galleria, as part of its development agreement with the City agreed to completely fund and operate a free shuttle running from the Kendall Square station on the MBTA Red Line to the Lechmere station on the Green Line. The service, begun in 1990, has since been cut back to just a run from Kendall Square to the Galleria (due primarily to low ridership on the Galleria-to-Green Line portion, and in the interest of maintaining the desired headways), but the mall developer has been joined by a private employer, Lotus Development Corporation, in funding the shuttle, which runs every 15 minutes from 7:00am to 10:30pm on weekdays (with an

abbreviated schedule on weekends). Annual ridership has climbed since the implementation of the service. The first full start-up year, 1991, saw a ridership of some 288,000. Ridership for 1994 was estimated at over 746,000.

Developer/Employer-Sponsored TDM Efforts

The regional economic slowdown begun in the early 1990s has created a difficult climate for active TDM efforts, and the City has been cautious in pursuing any mandatory travel demand management efforts. Although developers have been cooperative when approached to initiate TDM activities on their sites, employers have been generally hesitant with more coordinated efforts, such as the delay in creating a TMA in the Kendall Square area.

Although a comprehensive survey of all employers in the Kendall Square area is not possible at this point, Cambridge Center does operate an active demand management program, called Cambridge Center Transportation Services. Its key components are as follows:

- **Employee Transportation Coordinator (ETC) Support:** Boston Properties employs a full-time staffer to handle transportation-related issues at the Cambridge Center site for all tenants.
- **On-site Transit ("T") Pass Sales:** Monthly passes are sold from the Property Management offices.
- **Carpool/Vanpool Discount Parking:** Cambridge Center's 2,000 space garage offers a 20% discount for carpool and vanpool commuter spaces.
- **Carpool Matching:** In conjunction with a state-funded organization, Caravan for Commuters, Cambridge Center offers RideSource, a zip code-based matching program for potential carpoolers.
- **Transportation Awareness Day:** Yearly event, staged with community input and utilizing all available sources of information on commuting in the Boston/Cambridge region.

Problems and Issues

Lack of Housing in Kendall Square Area

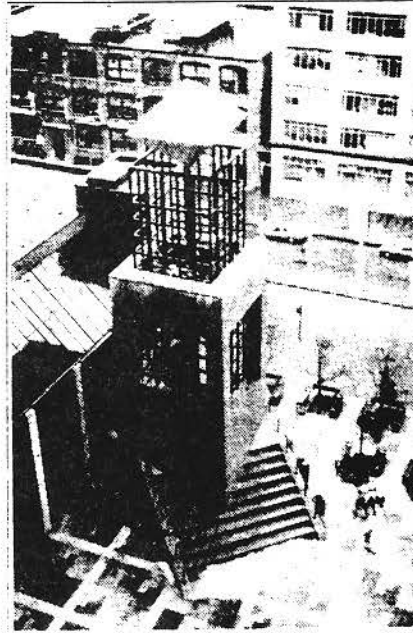
There is at present no housing, affordable or market rate in the immediate vicinity of the Kendall Square station. The Cambridge Redevelopment Authority has proposed future housing in the "West Parcel" which is located immediately west of the "triangle area." The success, however, of the high density housing at the nearby Lechmere Station area may be an indicator of the market viability of residential in this context.

Changes in Federal Funding

Much of this project was funded by grants from various federal agencies. Many of the programs have since been eliminated and there are few new sources to be tapped. One exception – ISTEAs – will continue to assist this site and the construction of transit, pedestrian, and bicycle improvements.

Slow Market and Leakage to the Suburbs

Existing and proposed large-scale development in the region remains on hold due to wary lenders and investors. This has made it difficult for new or growing enterprises to finance real estate. Market conditions at Kendall Square seem to have also slowed. Many on-site tenants have been working to renegotiate their lease rates. Recently, one of the largest "anchor" employers has decided to move out of Kendall Square to a cheaper suburban location with free and ample parking.



Case Study #6: Downtown Bethesda, Maryland

Introduction

The successes in Downtown Bethesda, both in terms of attracting new mixed-use development and in building in a transit orientation to new improvements, illustrate the power of very focused and directed public agency actions. Through a variety of planning and regulatory efforts, Bethesda has managed to tie together regional transportation goals and local urban design considerations. The result is that downtown Bethesda is among the top five most transit-oriented SACs in the country.



Site Description

Bethesda is in an unincorporated area of Montgomery County, Maryland that is inside the Capital Beltway. The SAC study area is aligned along Wisconsin Avenue, one of the major arterials leading into Washington, D.C. and is centered on the intersections of Wisconsin Avenue and Maryland Route 410 or the East/West Highway. It is set within the well-to-do suburban community of Bethesda-Chevy Chase.

Bethesda is a major employment center in the Washington, D.C. region and a regional destination for specialty shopping and dining. It is also the “downtown” for the southwest part of Montgomery County, particularly the Bethesda-Chevy Chase area. As the largest SAC in Montgomery County, Bethesda generates almost 4% of the County’s tax base. Bethesda is also fast becoming a prime urban neighborhood and a focus for arts and culture.

Bethesda is an important transportation center in Montgomery County. The Metro Center provides both rail and bus transit service. State highways go through the heart of Bethesda, although it is not located directly on the interstate highway system. The central node of the transit system is the Bethesda Station of the Metrorail Red Line. The station is part of a 103-mile Regional Metrorail System, operated by the Washington Metropolitan Area Transit Authority (WMATA). From Bethesda, direct service is available to the core of Washington, D.C. and to most of suburban Montgomery County. Rail service is provided at 3- to 6-minute intervals during the peak hours and at 12-minute interval during mid-day and evening non-peak hours.

In addition, Bethesda is served by two public bus operators, Metrobus (also operated by WMATA) and Montgomery County Ride-on. The two transit systems combined provide more than 40 peak-hour buses to and from the Bethesda SAC. All buses stop in a central underground bus terminal located above the

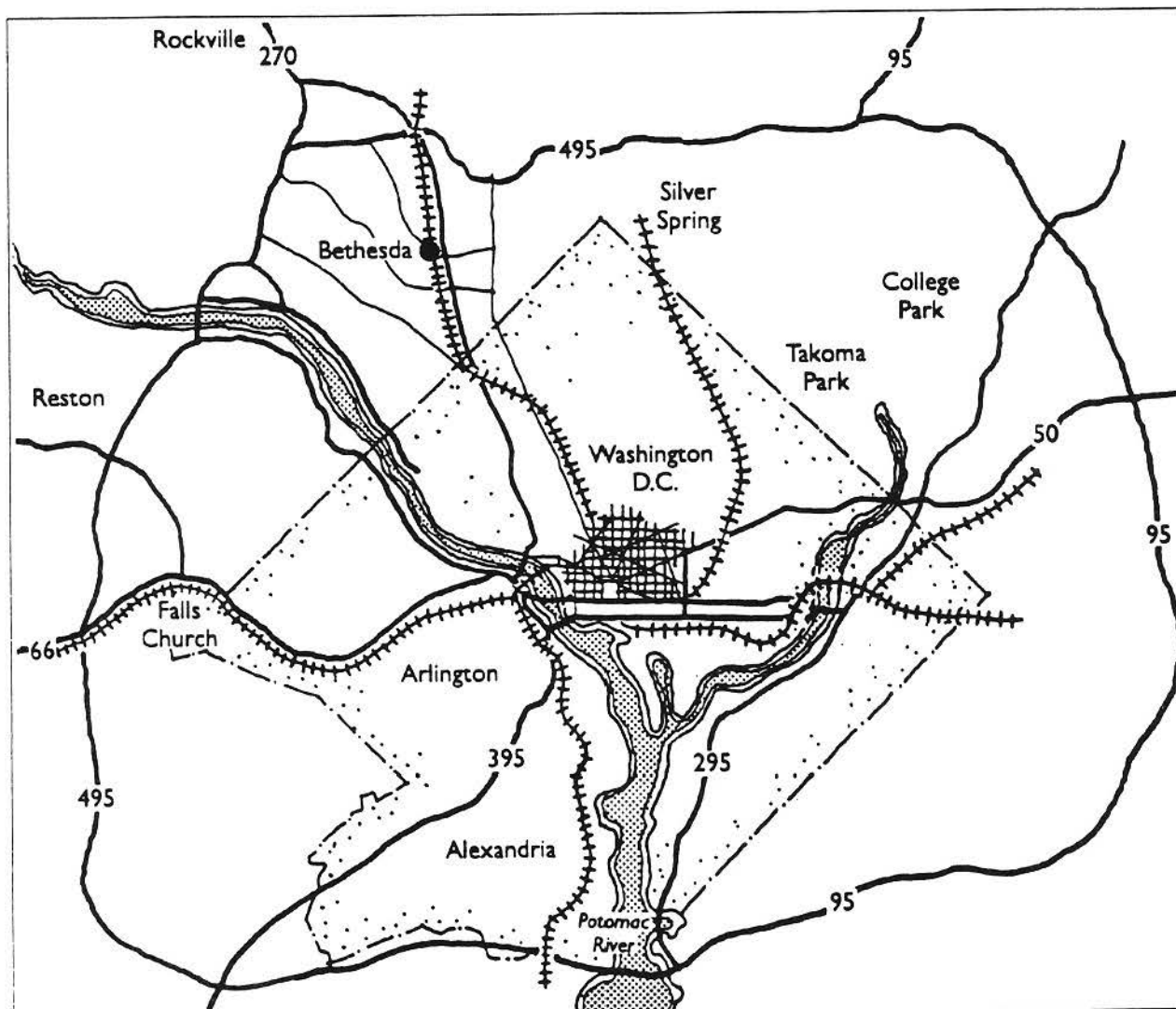


Figure 63: Bethesda is an unincorporated area of Montgomery County, Maryland that is inside the Capital Beltway.

Metro Station which minimizes bus-rail transfer time. The terminal is well integrated with adjacent land uses and includes service-type retail. Bus access to the terminal is made from a local street which minimizes congestion on the main arterials.

The Bethesda SAC study area contains just over 160 hectares (400 acres). Currently, Bethesda has a job capacity of about 37,000. 29,500 are office jobs, 500 are retail jobs and 2,500 are in other businesses. Bethesda has a population of close

to 11,000 in approximately 5,200 residential units. About 35% of the workers who live in Bethesda also work in Bethesda, another 41% work in downtown Washington. Only 24% work elsewhere.

Bethesda has a diverse and vital mix of employment, shopping, and public uses, as well as several large and medium sized hotels. It also has a growing housing component and is seeing an increase in up-scale multi-family housing at significantly higher densities than

previously built. It has the following mix of uses:

- 622,000 s.m. (6.7 million s.f.) of office space;
- 214,000 s.m. (2.3 million s.f.) retail space;
- 102,000 s.m. (1.1 million s.f.) other types of commercial space;
- Of the total 5,200 dwelling units,
 - 49% are high rise;
 - 38% percent at garden style apartments;
 - 13% are townhouses or single-family homes.

There are twenty major SACs of concentrated mixed-use development in the Washington, D.C. suburbs. And the region has all five of the most transit-oriented SAC in the country. However only a few of these have the urban qualities and pedestrian amenities found in Bethesda. These characteristics include a high-quality public environment in the Metro Core, a strong regional restaurant market, and an emerging cultural arts environment. Bethesda has the vitality of a diverse retail sector, a strong employment base, and a growing housing

component. This urban identity has developed while respecting the character of nearby residential communities.

Bethesda is considered the heart of the community by a growing number of Bethesda-Chevy Chase and other down-County residents. It provides many of the central functions common to traditional downtowns. Popular public facilities include a library, schools, and parks, complemented by private facilities such as churches and academies. Shopping at the major community retail center along Arlington Road offers encounters with friends and acquaintances. The public plazas and shopping streets have also become places for special community events. The retail space occurs in the ground floors of high-rise commercial buildings in the core area and low-rise street-oriented retail shops in the outer districts. There are no freestanding malls or strip centers. Public services include a police station, a fire and a rescue station, and a County government services center.

Travel Behavior

Commute Mode Split

A 1987 Metrorail impact study for downtown Bethesda found the commute mode split for workers and residents of the Bethesda CBD, before and after the opening of the Metrorail station in 1984, as shown in Table 8.

The opening of the station and the development associated with it have more than doubled the transit mode share, from 7% to 16% for employees working in Bethesda CBD, and from 15% to 27% for residents of downtown Bethesda. This is an important change in travel behavior, given that the region as a whole saw its transit mode share being eroded from 15% to 11% during the same decade, in spite of major investments in the Metrorail system.

The increase in transit usage for Bethesda employees was accomplished, however, primarily through a reduction of carpoolers, and to a certain extent by a decrease in walking, motorcycle and bicycle usage. The proportion of employees driving alone to work in the Bethesda CBD was not reduced by the opening of Metrorail. This suggests that the rail system gained ridership from people who were not driving alone to work before the line extension, such as carpool passengers and bus riders.

The SOV mode share for residents of downtown Bethesda was the same as the metropolitan area in 1980, but was reduced during the decade and is now significantly lower than the regional average. As opposed to employees in the Bethesda CBD, the increase in transit usage from residents was partially translated into a lower share of SOV travel. A substantial proportion of

Table 8
Comparative Mode Splits
Bethesda Activity Center

Travel Mode	Prior to Metrorail			After Metrorail and Redevelopment		
	Bethesda CBD		Region	Bethesda CBD		Region
	Employees (1)	Residents (2)	Residents (2)	Employees (1)	Residents (3)	Residents (3)
Drive Alone	71.9%	53.8%	53.9%	73.6%	47.7%	66.9%
Carpool/Vanpool	15.5%	14.0%	23.0%	8.3%	5.4%	16.2%
Transit	7.3%	15.3%	15.2%	16.0%	26.9%	10.6%
Walk	3.5%	14.1%	5.0%	1.7%	15.0%	2.5%
Bicycle	0.6%	-	-	0.2%	1.2%	0.2%
Motorcycle	0.6%	-	-	0.2%	1.0%	0.1%
Worked at home	-	1.6%	1.7%	-	2.9%	2.8%
Other	0.6%	1.2%	1.2%	-	-	0.7%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sources:

- (1) Post-Metrorail Transportation Characteristics Study, MNCPPC, July 1987.
- (2) 1980 Journey-to-Work Census data.
- (3) 1990 Journey-to-Work Census data.

Bethesda's residents commute by walking (15%) and this percentage remained approximately constant through the '80s.

More recently, the 1994 Sector Plan cites a non-auto-drive share of 27% (a 1% increase since 1987). County planners stress that, although the area lacks a Transportation Management Organization (TMO) or a specific employer-based trip reduction requirement, Bethesda is still a successful place in terms of demand management because development has been kept compact, mixed-use, within a walkable core near the Metrorail station, and the urban design process has consistently emphasized pedestrian access. In Appendix D of the Sector Plan, it is observed that "[b]etween 1975 and the 1989 base year, the total morning peak-hour traffic flowing into and out of the Bethesda CBD Sector Plan grew very little, about 15 percent inbound and almost zero outbound."

Automobile Trip Generation

Automobile peak hour trip rates in Bethesda are available for office buildings and residential sites. The sampled trip rates were compared with the nationwide averages from the *ITE Trip Generation Manual*. From the limited sample, the following conclusions can be made:

- Office trip rates in the Bethesda CBD are generally lower than the ITE rates, especially for the small office buildings (less than 9,300 gross s.m. or 100,000 gross s.f.). The distance to the Metrorail station was not found to be significant in explaining the trip rate variations. However, the transit mode split for large office sites was found to decrease significantly with the distance to the Metrorail station.
- Residential trip generation at the selected high-rise apartment tower in the Bethesda CBD is 44% lower than the ITE rate in the morning and 28% lower in the afternoon.

Keys to Success

Strong Public Leadership

A number of groups have had a strong involvement in creating the Bethesda that exists today. The dominant player in the development of Bethesda is the Maryland National Capital Park and Planning Commission. This Commission was responsible for the first sector plan for this area in 1974 and have prepared the more recent plan adopted in July, 1994. They provided the zoning and incentives and set up the beauty pageant process described below.

The roads are controlled by two agencies: the Montgomery County Department of Transportation and the Maryland Department of Transportation (MDOT). It has been their task to keep traffic flowing through the area at the same time that a major arterial has been turned into a "main street."

The Bethesda Business Partnership, which has been in existence for many years, has recently been reorganized and is taking on several new roles. It is taking over the task of promoting the area as a cultural district and recruiting businesses towards this end. It is also now responsible for maintaining and programming events on the streets and public open spaces of Bethesda. They are also coordinating a private effort to complete the Bethesda streetscape improvements started by the public sector.

There is no Transportation Management Agency (TMA) currently serving this area. As will be discussed in greater detail below, a TMA is being organized for the Bethesda Business District in order to implement the goals of higher Non-SOV travel.

Strong Market Demand for Mixed-Use

Because of its proximity to Washington, D.C. and the completion of the Metrorail Red Line, Bethesda experienced a boom in real estate in the 1980s. This boom has subsided, but land values, lease rates, and housing prices remain high.

Landowners and developers find Bethesda an attractive location for office space, as demonstrated in the development competition of the 1980s and early 1990s. According to the Sector Plan, close to 280,000 square meters (3 million square feet) of new office space was built in the Bethesda SAC from 1984 to 1994. The average annual office rents in 1991 were \$7 per square meter (\$24 per square foot) and ranged from \$5 to \$10 (\$16 to \$33). These figures are comparable to rental rates in Ballston and Courthouse Square Metro station areas in Virginia. Other employment opportunities include the National Institutes of Health and the Naval Medical Command, immediately to the north.

The retail market is also doing well. A large and diverse retail sector has grown despite the proliferation of suburban shopping and strip centers in nearby areas. Over the past ten years, almost 55,750 square meters (600,000 square feet) of new retail space has been completed. Rents range from \$4.25 to \$13.75 per square meter (\$14 to \$45 per square foot), depending on how close the site is to the Metro Center.

When housing is provided, new residents readily move to Bethesda. With a healthy mix of rental and ownership opportunities, the area's housing market caters to a diversity of singles and families.

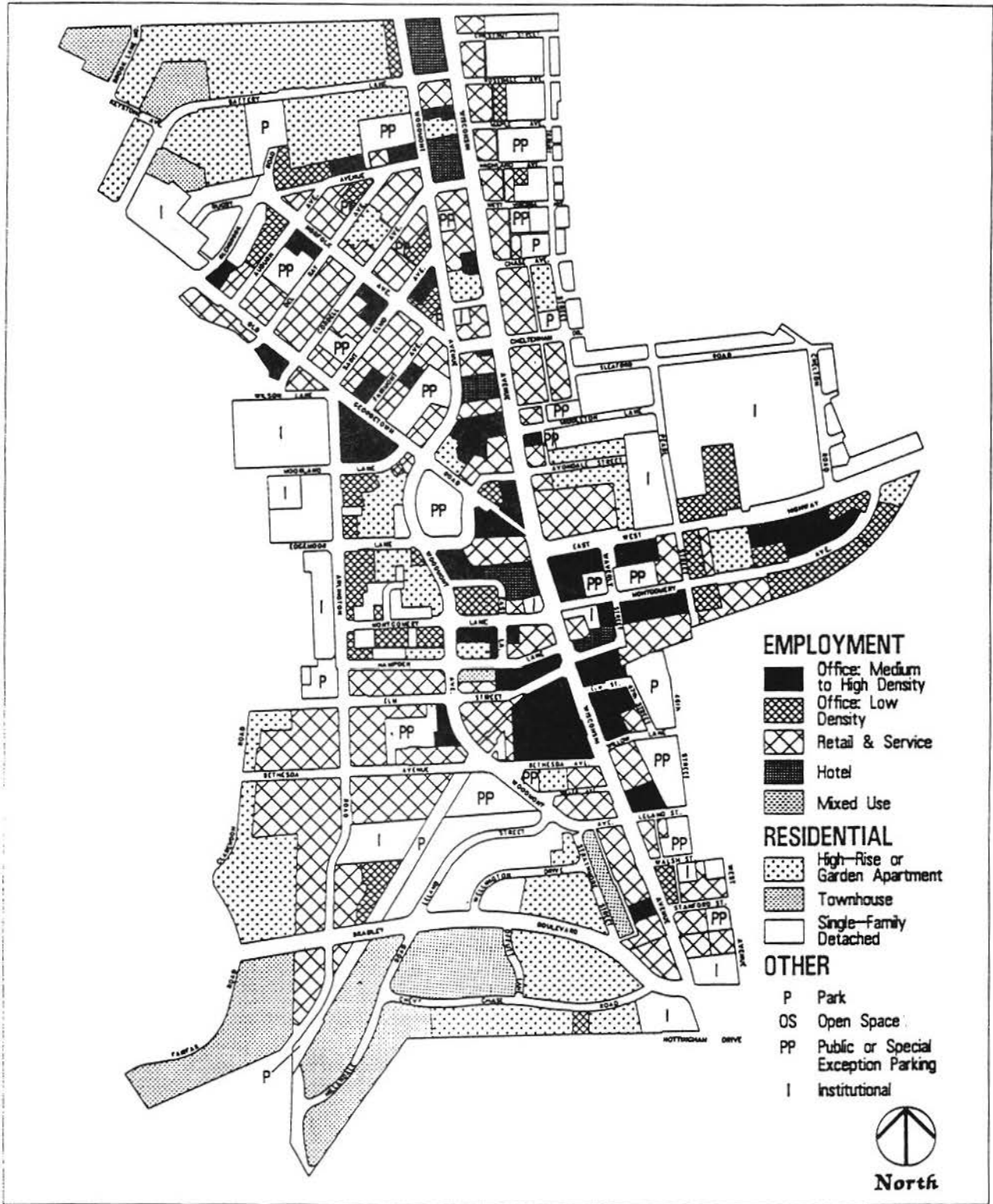
The strength of the Bethesda economy provides a strong revenue base for Montgomery County. Bethesda residents' high incomes and the appealing environment continue to attract developers, retailers, and shoppers to Bethesda. A continuing challenge is to ensure that the various types of new growth can be accommodated by transportation and other public facilities.

Coordinated Planning for On-Going Change

Bethesda started to evolve out of its rural past after the Civil War when major Federal government facilities were located close by. Later, just prior to W.W.II, it began to develop as a bedroom community. At the outbreak of hostilities of W.W.II, when the need for resident services in the area grew, Bethesda began to evolve into an identifiable business location. Office and retail businesses continued to seek out sites in Bethesda after the war with growth in the area focused around the major connector street that led back to Washington D.C., Wisconsin Avenue.

Over the years Bethesda developed a dual role. It became an unincorporated office and retail center serving the Capital region as an employment center. And, it became the downtown for a suburban residential neighborhood typified by small to medium size single family houses built in the Post W.W.II construction boom.

In the 1970s, the area was designated to receive a Metrorail subway stop. The 1970 Bethesda-Chevy Chase Master Plan expressed concerns regarding the advent of the Metro station. It raised questions about how the new transportation mode would affect the CBD, including whether it would stimulate positive



change, how to guide such change, and what its impact would be on surrounding areas. The plan recommended a CBD boundary, but did not specify kinds or intensity of uses. As a result of that plan the County Council reduced the size of the CBD and adopted the Commercial Transition (C-T) Zone as a means of protecting nearby residential communities. Public agencies then incorporated the transit station and major access facilities into various plans and programs.

In 1976, Bethesda Central Business District Sector Plan was prepared that effected a substantial down zoning, reducing theoretical development potential from 5.8 million to 1.15 million square meters (63 million to 12.4 million square feet). The Sector Plan applied a new transit station development area zone and CBD zones instead of the C-2 Zone, reducing Floor Area Ratios (FARs) from 14 to 6 in the CBD-3 Zone and to 4 in the CBD-2 Zone. This new zoning also set up a two option development permitting process. Landowners could go through a simple permit review process that granted them development by right (the "standard method"), or they could choose the "optional process" which gave them considerable additional rights in exchange for provision of various public benefits and amenities. To select proposed projects entering the optional process, a "beauty pageant" was established that ranks proposals by the extent of public amenities that are provided. Those projects with the greatest number of public amenities are the ones that receive development entitlements.

The 1976 Plan also recommended that high density commercial development occur on top of the station and in the surrounding area. This area of concentrated development was called the "Metro Core " and the site immediately

above the station was called "Metro Center." In order to spur additional private investment in the area, the Metro Center was to be built in the early years of the planning period. Eventually, a large retail-office-hotel complex and a central plaza over the subway station were approved for Metro Center site. This complex opened in 1984, the same year as the Metrorail station. The timing of these projects followed the general intent of the 1976 Plan and the Metro Core is largely complete today.

Along with the CBD Zone areas, the 1976 Plan addressed other commercially and residentially zoned land surrounding the Metro Core. Several other lower scale and lower density sub-districts were created with neighborhood shopping and restaurant districts. Several transitional zones were also planned in order to protect the adjacent, stable residential neighborhoods from disturbance and intrusion.



In 1982, the County Council adopted an amendment to the 1976 Bethesda Central Business District sector Plan which lifted a moratorium on optional method development beyond the core including most of the CBD-2 and the TS-R areas. Peak-hour vehicle trips became the overall limiting factor in granting development approvals in these areas. Two

thousand one hundred (2,100) trips were allocated to specific use mixes. The Amendment gave general guidance concerning the land use mix and described desirable features and public benefits to be provided by individual properties in the Metro Core District. (Additional information on this program is provided below.)

Since 1985, there has been no transportation capacity allocated for projects relying on the standard method of development. This has meant that all projects receiving approvals through the standard method must be highly transit supportive. Two amendments to the Sector Plan, the latest in 1988, allowed very small projects to receive subdivision approval, even if they created traffic impacts. In 1989, the County Council approved "loophole closure" legislation (Bill 25-89), which placed development limits on those properties recorded prior to 1982. If they generate fewer than 50 peak-hour vehicle trips, these loophole properties can obtain building permits without meeting further requirements. New subdivisions and loophole properties generating more than 50 peak-hour trips are required to meet Adequate Public Facilities (APFO) requirements.

Montgomery County and Bethesda experienced a rapid rate of urban growth in the late 1980s. Although this development has been contained within the limits of the County's growth management system, the experience justified a closer look at the impacts of future growth. As a result a new Sector Plan was prepared in 1994. This new plan will guide the maturing SAC for the next 15 years. It is essentially a "fine-tuning" of earlier Sector Plans and a reevaluation of original goals, rather than a radical change in direction. A key component of the plan is to

complete the Metro Core, still intended as the focus for the most intensive development, with high-quality infill structures, green open space, and streetscape improvements, such as trees, special paving, and outdoor seating. It also calls for encouraging a wide range of housing types to reinforce the image of Bethesda as a place to live as well as work. In terms of transit, the Sector Plan calls for a new shuttle bus loop around Downtown, the opening of a south entrance to the Metro Station, and the creation of a light rail trolley line connecting the Bethesda and Silver Spring Metro Stations, using an abandoned railroad right-of-way. Finally, the plan looks beyond the Core to surrounding commercial and residential districts, seeking to give these areas their own distinctive character and identity.

Supportive Regional Growth Policies

The development of the Bethesda SAC is part of larger plans for Montgomery County and for the State of Maryland. The 1993 General Plan Refinement of the Goals and Objectives for Montgomery County provides the framework for regional growth. This General Plan divides the county into four geographic components: the Urban Ring, the Corridor, the Suburban Communities, and the Wedge. Each area is defined in terms of appropriate land uses, scale, intensity, and function.

The Bethesda SAC is within the boundaries of the General Plan's Urban Ring. The vision for this area calls for "well established, lively centers with job and housing opportunities; strong residential neighborhoods; varied transportation options; relatively dense development; active public reinvestment; and commercial revitalization."

Montgomery County's Annual Growth Policy

In 1973, Montgomery County adopted the Adequate Public Facilities Ordinance (APFO) which tied new development with the availability of public services needed to support it. The APFO was supplemented in 1986 by the Annual Growth Policy (AGP) which identifies the need for public facilities to support private development and constrains the amount of private subdivision approval to those which can be accommodated by the existing and programmed public facilities (transportation, schools, water and sewerage, police, fire and health services). Transportation facilities are the critical factor in the approval of new development. Preliminary plan applications must pass two tests before they can be approved.

The Policy Area Transportation Review (PATR) determines whether existing and programmed transportation facilities in the county have the capacity to accommodate the traffic generated by proposed development in one of the policy areas. The PATR results in an annual growth ceiling for new jobs and housing units in each policy area, based on the impacts of new development on roadways at the local level (policy area) and on freeways at the countywide level. Performance of the transportation system is quantified to allow tradeoffs between transit accessibility and automobile level of service. All policy areas of the county must meet a level of service standard of C- for the total automobile and transit transportation system. Areas with poor transit coverage have more stringent standards for automobile level of service, and areas with either good transit service or larger transit usage can accept more traffic congestion. This system allows policy areas to accept more development by increasing transit usage.

The second test that preliminary plan applications must pass is the Local Area Transportation Review (LATR). The LATR determines if a proposed development will cause unacceptable traffic congestion at nearby critical intersections. Here also, standards are set such that areas with good transit service and usage are allowed more congestion. In order to encourage development where transit infrastructure is already in place, applicants in Metro Station policy areas, such as the Bethesda CBD, can be exempt from the LATR if they:

- Attempt to meet a mode share goal established by the Planning Board;
- Join a Transportation Management Organization established to meet the goal; and
- Pay a development approval fee.

Permitted development in the Metro area should not, however, cause the surrounding policy area to exceed its automobile level of service standards for the Policy Area Transportation Review. This is the controlling factor that sets development ceilings in the Bethesda CBD.

Bethesda CBD Sector Plan's Staging Requirements

The 1994 Sector Plan for the Bethesda CBD defines a staging process and specific goals and transportation improvements related to the County's Annual Growth Policy. The Plan defines three stages of development for the Bethesda downtown area. Stage I (short term) is defined to coincide with the job and housing ceiling of the Annual Growth Policy. The Plan specifies several goals to be attained before any development above the current ceiling is approved:

- Creation of a Transportation Management Organization;
- Constraints on the provision of long term parking;
- Attainment of a non-auto-driver mode share of 32% for the morning commute (currently 27%);
- Construction of high density development in the immediate vicinity of the transit station.

Stage II (mid-term) can begin when the ceiling capacity of the AGP is reached and all policies and improvements of Stage I are implemented and proven effective. A goal of 37% of non-auto-driver is set forth for the commute mode split in the second stage of development. Stage III is expected in 10 to 15 years, when an amendment of the Sector Plan will be required.

Deliberate Constraint of Road Capacities and Parking Supplies

Circulation

Downtown Bethesda lies at the confluence of two state roads: Wisconsin Avenue, a four-lane north-south arterial, and Old Georgetown Road/East-West Highway. These two roadways give the Bethesda CBD good vehicular accessibility, but also bring in a large amount of undesired through traffic. A major element of the circulation policy in Bethesda has been the ability to resist the pressure of ever increasing through traffic. Between 1975 and 1989, through traffic increased by only 15% inbound and remained almost constant outbound, in spite of the large increases in population and employment in the CBD during that period.

In Bethesda, the need for increased intersection capacity has always been balanced with the necessities of pedestrians and bicyclists. The

following traffic management strategies have been used to provide for adequate vehicular mobility while minimizing the negative impacts usually associated with increases in highway capacity:

- Implementation of a one-way couplet on State Road 410: East-West Highway handles the westbound traffic, while Montgomery Lane carries eastbound movements.
- Extension of Woodmont Avenue to the north and south to provide a bypass for north-south traffic on Wisconsin Avenue.
- Prohibition of left turns at selected locations along Wisconsin Avenue.
- Prohibition of pedestrians on the south leg of the major Wisconsin Avenue/Old Georgetown Road/East-West Highway intersection. Pedestrians use a tunnel under Wisconsin Avenue which comes out right at the Metro station and the bus terminal.
- Strict enforcement of pedestrian rules to avoid conflicts between vehicles and pedestrians crossing at the inappropriate signal phase.
- Turn prohibitions to divert traffic from residential streets.

Two elements of the transportation system review of the Annual Growth Policy also explain the success achieved in limiting through traffic:

- The PATR evaluates the traffic impacts of new development at a countywide scale. Most locations in Montgomery County are not incorporated as cities and decisions to approve new development are taken at a regional level. This has protected Bethesda from major auto-oriented growth at its upstream border.
- The LATR sets the critical lane volume standard for all intersections in Bethesda at 1800 vehicles per hour, the highest acceptable levels in the county. This relatively high standard of congestion acts as a deterrent for through traffic and make alternatives to the automobile more attractive.

Parking

The Montgomery County Planning Department has a policy of limiting the supply of long-term employee parking as a strategy to reduce commuting by automobile. The County keeps an inventory of the amount of both public and private spaces and tries to keep a ratio of total spaces to employees at about 0.50. A residential parking permit program is also in place to avoid the spillover of parking onto adjacent residential neighborhoods. This program is part of an overall strategy aimed at keeping a compact and intensely developed downtown.

Employers and developers have the option of either providing off-street parking themselves or paying a tax to the Bethesda Parking Lot District. The PLD is an independent taxing district. Thirty percent of the 20,000 parking spaces in Downtown Bethesda are public, while the remaining is privately owned. Ninety percent of the public spaces are on off-street lots and garages, while the rest is on the street.

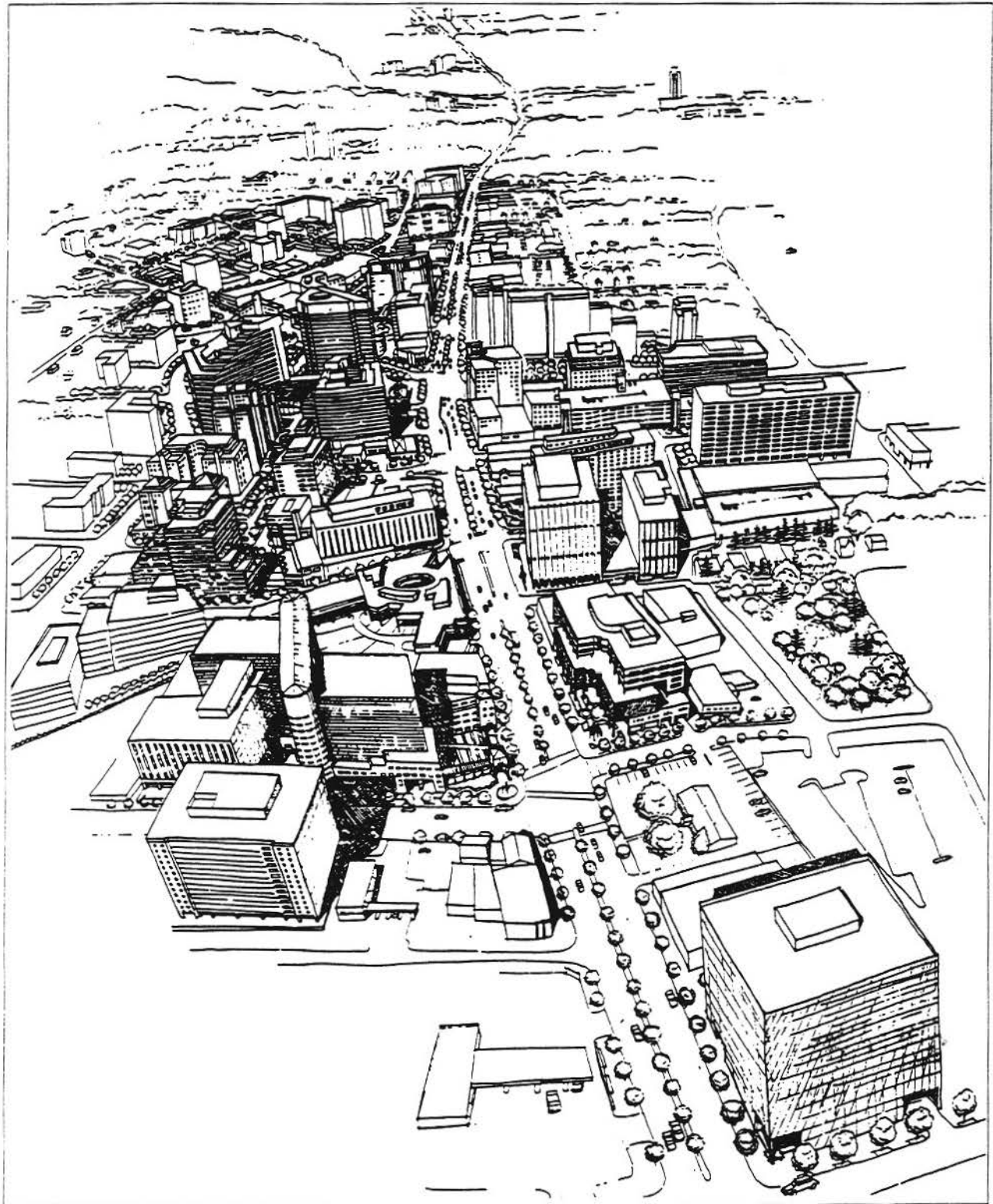
The Planning Department assumes that long-term parking in the Bethesda CBD will be used by both local employees and by commuters who use Metro. Provision is made for 500 spaces for Metro riders. Both employees and Metro riders are allowed to buy long-term parking permits, but no specific stalls are assigned to Metro riders. Bethesda is the only Parking Lot District served by Metro that does not have a parking facility paid by WMATA.

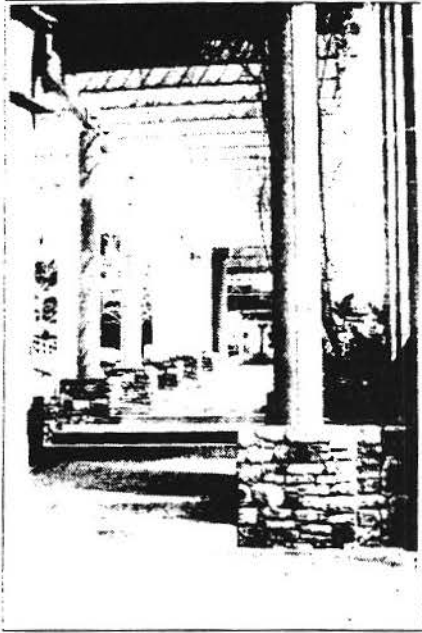
At the same time, the Planning Department has attempted to keep an adequate supply of short-term parking to meet the needs of the local businesses. On-street parking is preferred because it provides the most convenient access to stores and services, and provides a physical

separation between pedestrian flows on the sidewalk and vehicles on the street. In cases where short-term parking cannot be located on street, it is supplied on surface lots or near the ground level entry of public parking garages.

Emphasis on Pedestrian and Bicycle Enhancements

Through both direct public investment and the strict enforcement of design guidelines for new development, Montgomery County has managed to build in a fairly high level of bicycle and pedestrian facilities. The bicycle and particularly the pedestrian networks are relatively well-developed providing a high level of non-motorized access to the downtown Bethesda area. The introduction of Metrorail has helped supply a focus for improvements, and the most recent update to the Sector Plan, completed and adopted in July 1994, advocates an even more extensive bicycle and pedestrian network. Bicycle and pedestrian facilities will also play an increasingly important role in the Sector Plan's scheme to provide an even higher level of employment density, and to introduce a more significant portion of residential development in the downtown core.





Pedestrian Enhancements

One of the most interesting features of the Bethesda SAC is the quality of the pedestrian environment achieved through careful urban design and streetscape improvements. The "Discovery Trail," a mid-block pedestrian pathway combining sidewalks and urban spaces, is one of the best examples. The Montgomery County Planning Board approved in 1984 a Streetscape Plan, which has now been for the most part implemented. The plan called for undergrounding the utilities, planting trees, installing brick pavers, lighting, and wood benches. As mentioned earlier, an "optional development method" was offered to real estate developers, allowing them to build with higher density in exchange for the provision of streetscape improvements and public amenities. The optional method was popular and, as a result, 80% of the streetscape improvements were financed and built by the private sector.

Sidewalks in Bethesda must be at least 3.7 meters (20 feet) in width in the Metro Core area and 4.6 meters (15 feet) wide elsewhere in the CBD. Intersections must have constrained turning radii of 4.6 meters (15 feet) to slow down turning vehicles to 16 to 32 kph (10 to 20 mph), which is safer for pedestrians. Free right turn lanes separated from through traffic by an island are discouraged. Future plans for the pedestrian network include completion of the streetscape improvements, various intersection improvements and turning radius reductions, and addition of five pedestrian crossings.

Bicycles

Bethesda has a Bikeway Master Plan, but few bicycle routes are currently in place. Future plans for improved bicycle circulation in downtown Bethesda include completion of the Capital Crescent Trail to provide a regional connection with Silver Spring and Georgetown, creation of biker-friendly areas on certain streets where right-of way constraints preempt the introduction of a bike lane, improved bicycle signs, and various intersection improvements.

Transportation Demand Management

Specific TDM efforts in Bethesda remain fairly unexplored, although there has been an increasing emphasis on demand management in the last decade. Bethesda is not incorporated as a separate municipality within Montgomery County, and must rely on the County for nearly all of its urban services and administration. There is currently no legal employer or developer requirement to implement employee commute option (ECO) programs. The introduction of Metrorail in 1984 has provided a strong and comprehensive connection into the Washington, D.C. metropolitan area transit

services and has provided a viable alternative to single occupant vehicle use in downtown Bethesda. However, anticipated growth is expected to alter this situation in the near future. Montgomery County planners are calling for stepped-up TDM-related activity, including the creation of a Transportation Management Organization (TMO), in order to help achieve the goal of increased non-SOV use. Developers of new commercial and office space are now being required to join the existing area-wide ridesharing network, and to pledge to join the TMO when it is created.

Bethesda Parking Lot District

As mentioned earlier, employers and developers have the option of either providing required off-street parking themselves or paying a tax to the downtown Bethesda Parking Lot District in lieu of that requirement. This parking policy has provided an effective mechanism to constrain the supply of parking in downtown Bethesda.

Montgomery County Commuter Services

In the absence of a downtown Bethesda-specific TMO, the Montgomery County Commuter Services Section acts as the support organization for employer-based commuter programs strictly on a voluntary basis. At present, these basic TDM related services are being offered:

- Rideshare matching/placing;
- On-site transit pass sales support (Montgomery County discontinued its FareShare transit subsidy program in 1994, Commuter Services has continued to support employers who provide on-site sales and some subsidy for their employees);
- Employee Transportation Coordinator (ETC) training; and
- Alternative mode education/promotion.

Montgomery County Adequate Public Facilities Ordinance

As a component of Montgomery County's growth policy, the County's APFO Ordinance requires surrounding infrastructure be sufficient to support a given level of new development. Although the ordinance is directed more at staging development, the policy allows new TDM actions to be implemented concurrently with new development.

Private Sector Efforts

Although ECO programs are not specifically required, a total of 137 employers throughout the CBD are engaged in some form of employee demand management. In the absence of a TMO or any reporting requirement, detailed information on employer-based measures used is not directly available.

Current Problems and Opportunities

Inability of the Beauty Contest to Respond to Changing Market Conditions

One of the major complaints about the "beauty pageant process" the County set up is that a number of the developers that participated went bankrupt after their projects were approved through this design competition. The developer who offered the most amenities in each year's competition received the right to build. Though this system worked well during the rapid growth times of the 1980s, it fell short during recessionary times. Thus, recent project proposals have lacked the impressive amenities easily proposed when the market was highly competitive. The County defends the process saying it resulted in a great downtown in ten

years and those developers might have gone under any way. But the result is that there is some tension between the public and private sectors.

Development of a Parking Reduction Program

Planning recommendations are now being considered which are intended to further limit the supply of employee parking in Bethesda.

Development of Housing

Planning recommendations are now being considered which are intended to increase the supply of both the affordable housing and market rate housing in the Bethesda area. Bonus incentives are to be provided to developers who provides affordable housing. The plan calls for a build out of 2,700 residential units by the year 2010.

Promote Retail

The County planners recently prepared a study that addresses the service, convenience, specialty, and support markets. This study endorses goals and policies and makes recommendations which are in support of almost all types of retail. Much of the success of Bethesda is attributed to the presence of a vital retail community.

Conclusions

The success of Bethesda in limiting single-occupant vehicle travel can be attributed to a coherent land use and transportation strategy originating in the 1970s:

- The decision to locate in the center of Bethesda the planned Red Line station of the new Washington Metrorail system;
- The creation of a compact central business district around the new station;
- The staging requirement in the 1976 Sector Plan that forced high density development to occur in the immediate vicinity of the Metro station, before lower density development could occur elsewhere in the planning area;
- A strong emphasis on the quality of the pedestrian environment through urban design and streetscape features;
- A review process for new projects which has authorized development levels above what would normally be supported by the roadway network.

Chapter 8: Conclusions and Future Actions

Post-World War II urban development patterns can, in some ways, be characterized as an experiment in free enterprise and local autonomy. The public has given office and commercial developers great latitude to select sites based on low land costs, high visibility, and easy access regardless of the impact on regional travel patterns or proximity to affordable housing. Simultaneously, local governments, in an effort to maintain fiscal solvency, have permitted new developments with little consideration of regional growth patterns, transportation investments, air pollution levels, or quality of life for citizens.

However, it is not just the siting of major job centers that has had an impact on the livability of our regions, it is also their design. Most Suburban Activity Centers are located at the periphery of regions or in corridors that are so low density that transit cannot be provided at any reasonable cost. Once an employee gets to work, he or she cannot reasonably expect to do anything else without needing a car. Getting a sandwich for lunch, visiting a bank, dropping a child at daycare – all the errands that most working people need to take care of on a daily or at least weekly basis – are only possible via an automobile. Thus, without the option of occasionally walking for some on-site trips, Suburban Activity Centers have become the domain of the car and in some very intensive centers, strangled by congestion.

Tackling the regional problems that have emerged from SACs – excessive congestion,

longer commutes, lack of affordable housing, declining air quality, and regional sprawl – will require cooperation at all levels of government, in partnership with the private-sector, to ensure long-lasting remedies. A few regions have begun this process. Perhaps the two most important ingredients for success are: 1) solutions that emerge from a “bottoms-up” consensus-building process and 2) being willing to face difficult choices, such as directing growth toward transit-served corridors and defining limits to regional sprawl.

At a site-specific level, SACs need strategies that transform “edge cities” into integral building blocks of our communities. These centers should be living parts of our cities: places to work, live, and enjoy family and friends. Their physical design, the mix of uses, and how they are managed should create places that are inviting destinations for “civic” life, not just places of commerce. Though newly developed centers present the greatest opportunity to incorporate these concepts, every effort should be made to “recycle” existing centers. Retrofitting auto-oriented places to pedestrian-oriented patterns should be the challenge of the next wave of suburban growth.

Further research on this topic should address the market practicalities of retrofitting SACs, as well as identifying detailed techniques for creating walkable destinations in Activity Centers, improving the interconnected nature of local street systems, integrating transit, and enhancing public outdoor spaces and amenities.

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