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16. ABSTRACT This document provides the reader with a review of pertinent reference materials dealing with residential-employment patterns for evaluating public service delivery. It includes: (1) References categorized by Land-Use, Energy and Environment; and (2) General research in the area of residential employment linkages. The form of the bibliography and its accompanying annotations may provide a guide to other source material. It is not intended that every available reference be included in this document. Only those studies anticipated to be within the framework of the follow-up study have been included. An update of articles will be included in future documents.					
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**A Compilation of Articles Reviewing
the Proximity of Residential Communities
to Surrounding Employment Centers**
(A State-of-The-Art Document)

by
**Shirley J. Seaborn
and
Earl Washington**

Center For Transportation Training And Research
Texas Southern University
3100 Cleburne
Houston, Texas 77004

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Executive Summary

Many issues are still unresolved relative to the most desirable options for improving service efficiency and providing adequate transit services for urban and suburban residents. The form of the bibliography and its accompanying annotations is intended to provide an overview of the research that has been accomplished in this area. It is not intended that every available reference be included in this document. Only those studies anticipated to be within the framework of the follow-up study have been included. An update of articles will be included in future documents.

In the meantime, this document is designed to provide the reader with a comprehensive reference source of important reports, books and manuscripts that deal with residential-employment patterns for evaluating public service delivery. This document has two primary objectives: 1) to provide ample references under a single cover on this topic, and 2) to encourage future scholars in the transportation field to continue research in the area of residential employment linkages.

I. User's Guide

This annotated bibliography addresses one phase of a detailed study on the relationships between residential and employment locations and on alternative methods currently in use to provide appropriate transportation linkages between the two. Although there are a number of studies to evaluate public transit service delivery, this document attempts to cover the portion of the existing research relating the service delivery to the locations of residence and the employment. The two major sections consist of: A **Selected Review of the Literature** and an **Annotated Bibliography**. The review contains a brief summary of the selected literature, cited in the Section III. Documented service strategies for identifying types of service or functions and for improving service coordination in a multi-provider environment are also provided. The sections contain selected references and current applied and empirical research relating to development, spatial patterns, alternative routing structures and economic efficiency. This state-of-the-art document summarizes previous research into four general categories: 1) Employment-Residential Patterns, 2) Energy, 3) Environment and 4) Land-use.

II. A REVIEW OF SELECTED LITERATURE ON RESIDENTIAL-EMPLOYMENT PATTERNS

Previous studies provide insights into the nature of transportation service configurations, institutional arrangements for increasing service effectiveness, and the design and utilization of appropriate marketing strategies and practices to meet customer needs and improve public transit service delivery. The focus of previous studies ranges from the evaluation of spatial patterns of person trips to suggestions for improvement in transit services to rural and suburban areas.

An examination of the findings of previous studies reveals certain common themes central to the analyses and evaluation of service delivery models and approaches. Issues enumerated include those models that focus on ridership increases, improved service effectiveness, and organizational change (Schneider and Smith, 1981; Newman, et. al., 1983; Blake 1990). Existing findings indicate that concerns about rising industry cost and reluctance to increase public subsidies have caused public transit operators to consider alternative service arrangements as one of the means for increasing efficiency and thus reducing the cost for service.

A. General Overview

In recent years, growth in suburban employment has spawned the development of large, regional office and retail complexes, which has resulted in the creation of more densely developed minihubs in many metropolitan areas. Such clustering of development has the potential for providing a viable base on which to develop a network of suburban transit routes.

This state-of-the-art document summarizes previous research relating to development, spatial patterns, alternative routing structures and economic efficiency in four general categories: 1) residential employment patterns; 2) energy; 3) environment; and 4) land-use.

B. Employment-Residential Patterns

A report published in 1987 by Yaser Mohammad Ali Najjar examines the spatial patterns of person trips and trip generation. The report discusses and explains patterns of travel flow between various traffic zones and explored similarities in flow patterns, as well as investigates the factors which influence the patterns and volume of generated trips. The author concludes by formulating a set of person trip models, which specify and predict the functional relationships between generated trips and the locational, demographic, and socio-economic characteristics of trip makers.

Anderson (1989) suggests that transit service to rural or low density areas can be improved by selective private contracting, owner-operated systems and commissioned drivers. These programs are eligible for financial assistance through Rural America's New Rural Transportation Investment Program. Ferguson (1990) reviews the role of Transportation Demand Management Organizations (TDM) in the mitigation of transit and traffic problems. He asserts that effective TDMs require the cooperation of many actors, who may include developers, landowners, employers, business associations, and municipal, county, regional and state levels of government.

The Entrepreneurial Service Program (1989) outlines UMTA's Entrepreneurial Service Program that is designed to stimulate the development of creative small business ventures that will supplement conventional public transit systems and respond to the unmet transportation needs of both inner-city and suburban areas.

C. Energy

Hewings (1989) explores the link between transportation, location and energy. The results indicate that despite many attempts to connect transit systems and reduce energy consumption in the nation, the basic structure of urban systems remains unchanged. King (1984) examines the causes and effects of movement of lower income households to relatively inconvenient residential locations. Consequences were expected to include increased dependence by lower income households on car use, increased petroleum related travel cost relative to incomes, and other social equity effects. In conclusion, the study demonstrated the need to see a change in transportation, specifically, changes in the modes of travel for the journey-to-work in the context of changing processes of intra urban migration.

D. Environment

The Metro-Dade Transit Agency (1987) reviewed the transportation and environmental impacts of constructing the Omni and Brickell legs of the METRO mover system. Impacts are compared with the no-build alternative. Results indicate that the projects would increase transportation capacity in downtown Miami, improving trips, increasing the mode share of person trips using transit, and improving circulation and mobility among major activity centers within the study area. The New York City Department of City Planning provides further evidence of the ability of transportation projects to positively maintain the environment in their report of the environmental impacts of an alternative known as Broadway Plaza's Pedestrian and Transit Mall.

E. Land-use

Cervero (1988) examined the potential mobility benefits of developing mixed suburban workplaces where offices, shops, banks, restaurants and other activities are built side-by-side. It is suggested that mixed use developments could be encouraged in suburbia through various zoning and tax policy initiatives. Gordan (1989) explored the relationship between dispersed activity centers and the remainder of the Los Angeles Metropolitan area and the provision and performance of conventional and paratransit service for the subcenter.

Orski (1988) argues that mass transit alone cannot solve the congestion problem in suburb to suburb commuting. He suggests that congestion management consists of: 1) cost sharing, requiring developers to share in the cost of transportation improvements; 2) private sector involvement in traffic mitigation through transportation management associations (TMAs); and 3) regulatory innovations, including private participation in traffic mitigation.

Valdez et. al. (1988) explained the background and findings of a study designed to assist in planning and implementing Transportation Demand Management (TDM) strategies at a major suburban activity center. The findings suggest that major opportunities exist to improve mobility through implementation of TDM measures including land-use planning.

The next sections of this report provide annotated bibliographic data and a comprehensive listing of references.

III. ANNOTATED BIBLIOGRAPHIC DATA

A. Employment Residential Patterns

Anderson, Carol L. **Community Transportation Leaders Pioneer Entrepreneurial Efforts**, Community Transportation Reporter, Vol. 7, No. 2, February, 1989.

This article examines three ways to improve transit services to rural areas: selective private contracting, owner-operated systems, and the commissioned drivers Rural Transportation Investment Program which initiates fleet and route expansion using one of the alternative structures. This program can receive financial assistance through Rural America's New Rural Transportation Investment Program.

Bunch, Jim and Douglas Moore. **Data Preparation for a Ridership Sensitivity Model**, Submitted to Metropolitan Transit Authority of Harris County, Houston, Texas.

This paper focuses on the issue and the problems that arose during data collection for the sensitivity model calibration. The paper also explains the analysis of the 3-phase Capital Improvement Program engaged by Houston Metropolitan Transit Authority (METRO) under the 5 year plan. The analysis concluded that a new "sensitivity" model was needed because it was felt that the travel demand forecasting process employed at Metro could not answer all the questions being asked or meet the METRO Board of Directors deadlines.

Burggraf, S. P. **The Role of Public Transportation Systems in Economic Development Prospects for the Southeast Interim Report**, Florida State University, UMTA, March 1984.

This report examines the economic structure of the Southeastern Region and analyzes linkages between public capital such as transit system and the economic development prospect of the region.

Cantor, D. and W. Bell-Taylor. **Development of Reverse Commute Demonstration Projects**, National Center for Neighborhood Enterprise, UMTA-DC-20-2027.

The report gives an insight to future planning and development. This project enables the National Center for Neighborhood Enterprise (NCNE) to provide technical and financial assistance in the development of entrepreneurial transit services. The project's aim is to design a transportation system to provide affordable reverse commuter service for residents of public housing developments selected by NCNE to suburban employment sites.

Christiansen, Dennis L. **Freeway Transitways as a Means of Serving Regional Travel Demand: The Texas Experience**, Texas Transportation Institute, 1987.

This paper gives an overview of the development process of the Houston Regional Transitways as the city was developing an extensive system of freeway transitways as a major means of accommodating projected growth in areawide travel demands. The system provided excellent mobility since the new lane miles of freeway were opened at the rate equal to the increase in travel demand through much of the 1960s. However, around 1970, new freeways were built at a rate of 25% instead of the 300% rate of the previous decade. Secondly, with migration to the Sunbelt, vehicle-miles of travel increased at an annual rate of 6% throughout the 1970s. Public opinion surveys consistently show that traffic, mobility and increase in congestion led to the conclusion that no one agency could "solve" the mobility problem.

Cushman, King. **Pierce Transit Makes Accessibility Work**, Community Transportation Reporter, Vol. 5, No. 9, pp 13, October/November, 1987.

This article summarizes the extent to which "the right stuff" required commitments from all levels within an organization and public to the Washington State Transportation System to overcome barriers to serving disabled people. Such "right stuff" includes Board of Directors, management, staff and the public.

Farkas, A. and R. Trotter. **Study to Access Transit Accessibility to Suburban Areas and Suburban Mobility Needs**, Morgan State University, UMTA-MD-11-0008, September, 1989.

This study examines available transportation options and offers specific short and long term policy recommendations to meet the suburban mobility needs of inner city residents. The movement of the middle and upper income urbanites to the nation's suburban areas has left concentrations of low income, transit dependent households in inner cities. Many financial institutions, retail establishments and manufacturing plants have joined the exodus to the suburbs. This movement of industry to suburban areas has left many inner city residents, especially those without automobiles, jobless. Generally, for suburban residents, existing highway and transit links to Central Business Districts and suburban jobs sites are established. For inner city residents, however, transit accessibility to suburban jobsites are notably inadequate.

Ferguson, E. **Transportation Demand Management: Planning Development and Implementation**, APA Journal, No. 442, Autumn, 1990.

This article reviews Transportation Demand Management Organization's new forms which include transportation management associations, trip reduction ordinances, and negotiated public-private agreements. Since Transportation Demand Management (TDM) is not seen as a panacea to traffic/transit problems, the article suggests that TDM requires the cooperation of many players who may include developers, landowners, employers, business associations, and municipal, county, regional and state levels of government. The article concludes that effective TDM strategies include on-site employee transportation coordination, parking management provisions, and alternative work schedules.

Fisk, Carol Fraser. **Transportation: The Catalyst of Elderly Mobility**, Community Transportation Reporter, Vol. 6, No. 10, October, 1988.

This article reemphasizes the fact that transportation is the catalyst necessary to access the many services that help define quality of life in our society for the elderly and the aging. The article also names the Administration on Aging (AOA) as a visible advocate for the elderly along with the U.S. Department of Health and Human Services (HHS), other agencies of government, and the private sector.

French, David K. **Transportation Planning in a Rapidly Growing Major Metropolitan Area**, Parsons Brinkerhoff Quade & Douglas, Inc. 1987.

The author discusses the techniques, criteria, and evaluation measures used in two successive sub-metropolitan transportation studies—the Eastside, Central and West areas of the Phoenix metropolitan area in Arizona. Further, the discussion emphasizes that simple, pragmatic techniques for analyzing highway systems in urban areas can result in a very successful transportation plan. In conclusion, the process through which decisions are made was discussed with regard to implementing transportation improvements and the success of a planning program.

Due, John F. et al. **Strategies for Adequate Transportation Service to Small Communities**, Transportation Service to Small Rural Communities 1st ed., pp. 180-204, Iowa University Press, 1990.

This report provides an in-depth review of the changes in transportation service to small, rural communities since the economic deregulation of the air, bus, rail, and truck transportation industries. It also outlines and describes better approaches to the solution of rural transportation problems. It further examines by mode the nature of recent changes in regulatory policies, the nature of service provided to small rural communities, and the impacts of deregulation on transportation service to these communities.

Entrepreneurial Service Program, PTI Journal Directory, 1989.

This article discusses the Urban Mass Transportation's Entrepreneurial Services Program which is designed to stimulate the development of creative small business ventures that will supplement conventional public transit systems and respond to unmet transportation needs of both inner-city and suburban areas. The program is also designed to identify promising transportation markets within communities and to design innovative, self-sustaining services.

Goodman, J. **Employment Transportation Assistance Project**, Community Family Life Services, UMTA-DC-06-0543, September 1989.

This project describes the support plan of Community Family Life Services, Inc. efforts. It further establishes a mechanism within Washington, D.C. to match unemployed residents with specific jobs in the suburbs. The approach combines efforts of the non-profit sector with the for-profit business community. The objectives of this project are to provide transportation for D.C. residents

to employment sites in the outlying Washington Metropolitan area, to locate employers not accessible to mass transit who will hire D.C. residents who are unemployed, homeless, or ex-offenders and to prepare these residents for full-time employment in the suburbs.

Gordon, Harry P., and Myug-Jin Jun. **The Communities Paradox: Evidence From the Top Twenty**, Journal of the American Planning Association, Vol. 57, No. 4, Autumn 1991.

This paper presents a rather paradoxical assumption that may exist in widespread reports of congestion in spite of stable average trip durations. The paradox assumes that perhaps average commute times are contained by the locations adjustments that households and businesses make. A comparison of auto commuting trip durations from the 1985 American Housing survey to 1980 census data for the twenty largest metropolitan areas examined whether or not the average trip duration fell by a statistically significant amount or remained the same.

Greater Bridgeport Regional Planning Agency. **Private Industry Bus Pool**, Bridgeport, Connecticut, Sponsored by U.S. DOT and UMTA, January 1988.

This study provides an overview of highway network, population, employment and commuter travel characteristics. It discusses employment strategies that can be used to encourage employees to commute in carpools, vanpools or public transit. The purpose of this study is to explore enhanced public transportation opportunities for commuters working in the Greater Bridgeport Region of Connecticut, and to determine employment based transportation. The study objectives were to identify employer interest in providing employees with alternative services, and to develop strategies to promote rideshare and public transit for the commuter having difficulties commuting to work.

Guiliano, Genevieve. **Transportation in the Context of Accessibility, Land Use Impacts and Transportation Investments**. Highway and Transit, The Geography of Urban Transportation, 1986.

This excerpt presents the relationship between land use and transportation, and the structure and capacity of the transportation network affecting the level of accessibility within a given area.

Hanson, Susan Ed. **Dimensions of the Urban Transportation Problem, The Geography of Urban Transportation**, Guilford Press, N.Y. 1986.

This paper examines the phenomenon of urban lives suffering when transport arteries and mobility prove impossible. The paper also points out how blizzards that periodically envelope major cities give urban populations a fleeting taste of what it is like to be held captive (quite literally) in one's own home for several days. With roads buried in six feet of packed-in snow, how can one obtain food, visit friends, get medical care for a sick child--not to mention get to work?

Hodge, David. **Social Impacts of Urban Transportation Decisions: Equity Issue**, University of Washington, 1989.

This article focuses on the primary function of a transit system, which is to provide connections between activities, with comfort as a secondary concern. Several procedures were discussed including the percentage of population within a standard travel time to specified locations. The maximum time permitted in the guidelines, with respect to the activity and the size of the metropolitan area, varies. Further, the report explores issues related to the automobile, especially problems associated with the construction of highways and with pollution generated by auto use. Finally, issues related to mass transit, with special emphasis on the problems of transit dependents, and the issue of who pays and who benefits from public subsidy of mass transit are covered.

Hooson, R. **Evaluation of the Caltrain Feeder Shuttle Program Serving Suburban Workplaces**, Transportation Research Board, Transportation Research Record No-1308, 1991.

This research project describes and measures the success of a two year old small-vehicle feeder service between San Francisco Peninsular Commuter Train stations and Suburban Employment Centers. The typical passenger of this service is well educated. The project outlines an early planning process leading to development of contract specification and binding. Among other issues, the report describes the operational experience, ridership growth (including the effects of the October 1989 earthquake), and marketing activities in a passenger survey.

Hughes, M. A. **Employment Decentralization and Accessibility: A Strategy for Stimulating Regional Mobility**, Journal of the American Planning Association, Vol. 57, No.3, Summer 1991.

This article explores the implications of the emerging settlement structure for employment accessibility in northern New Jersey from the region's center, the city of Newark. The article also presents descriptive data on employment accessibility in the Newark Metropolitan Region. In the 1980s, Northern New Jersey underwent a development surge that extended the Metropolitan periphery and dramatically shifted employment across a larger and more dispersed set of locations throughout the region. In the article, a range of policy responses to this decline are briefly outlined.

Jansen, G. R. M. and T. VanBuren. **Travel Patterns in Dutch Metropolitan Cities: The Importance of External Trips**, Transportation Vol. 15, No. 4, December 1988.

This report uses a variety of data sources depicting decentralization of population and employment in four Dutch urban areas (Amsterdam, Rotterdam, The Hague and Utrecht) over the last twenty years. It is found that suburbanization is related to more auto use which increased the number of external journeys related to metropolitan cities. The 1982 National Travel Survey is used to study current travel patterns in and around metropolitan areas; the importance of external trips for urban transport planning is clearly shown. External trips count for about half the number of city related car trips, and for nearly three quarters of the total vehicle kilometers of travel within the city.

Janelle, Donald G. **Metropolitan Expansion and the Communications-Transportation Trade-Off**, University of Western Ontario, 1989.

This article depicts travel distance increasing while travel time remains relatively the same. It further explains the role of new technologies in communications, its relationship with transportation, and its likely impact on the development of urban areas. Finally, a conceptual framework is presented to relate the structure and function of urban regions to changes in the significance of distances.

Joint Center for Political Studies. **Changing Household Patterns and Worktrip Transit Use, Demographic Trends and Changing Worktrip Patterns**,

Report submitted to the Urban Mass Transportation Administration, Vol. 1, Final Report, February 1985.

This publication examines how household vehicle ownership and transit use are related to measures that reflect transportation needs of the household, namely: 1) the number of people in the household and 2) the number of workers in the household.

Joint Center for Political Studies. **The Changing Location of Worker, Demographic Change and Recent Worktrip Travel Trends**, Submitted to the U.S. DOT UMTA Final Report, Vol. 1, February 1985.

This report focuses on population, demographics, and the relative ramifications that shifts in population and demographics have on transit use. Although, the report states traditional mass transportation systems are most efficient in densely populated service areas, the three major movement patterns as contained in this report are as follows: 1) movement from more populous regions to less populous regions, 2) movement from metropolitan areas to non-metropolitan areas, and 3) movement out of central cities into suburbs.

Jolibois, S. C. Jr. **Benefit-Sharing, Joint Development and Value Capture: Mass Transit Planning into and Beyond the 21st Century**, Transportation Research Board, Urban Mass Transportation Administration, August 1986.

This report defines the terms and examines the historical origins of private sector involvement in transit systems. It lists techniques and expected results of benefit sharing and value capture policies. It also analyzes the impacts of these policies in the context of inner city development and proposes steps to achieve complete integration of issues and methodologies for future transportation planning programs.

Kasarda, J. D. **Population and Employment Change in the United States: Past, Present, and Future**, Transportation Research Board Special Report No. 220, 1988.

This paper presents a broad-crust overview of the demographic and employment dynamics that shaped America in the later half of the 1980s, as well as, the statistics and projections to predict what that shape will likely be during the first quarter of the 21st century. The paper begins with a post-World War II appraisal of interregional employment shifts and corresponding migration adjustments. The paper concludes with a consideration of the on-going economic transformation

of America's cities from centers of goods production to centers of information processing and the implication of this transformation for employment opportunity and transportation policy for the resident population.

Krueckeberg, Donald A. and Arthur L. Silvers. **Urban Planning Analysis: Methods and Models**, John Wiley & Sons, Inc., New York, London, Sydney, Toronto, 1989.

This article shows how variations of the gravity model may be used to evaluate public facilities, retail shopping centers, and residential location behavior. Secondly, it examines methods for statistically estimating the parameters of the model. In conclusion, the article states that, it is not the distance nearest the destination, but the distance to the destination that generates users, and since the need for a given type of destination varies from person to person, it would be more effective to use a limited budget to locate a diverse collection of destinations in one central place. The purpose of this model was to increase the likelihood of a user's finding a specific destination at the nearest (central) facility.

Leinberger, Christopher B. **Business Flees to the Urban Fringe**, Robert Charles Lesser & Co., July 1992.

This article explores the implications and reasons for the radical relocations of what were once the best-paying new jobs of various distinct types of employment categories from metropolitan cities across the nation to the urban fringes. The highest paying jobs, according to this report, are those injecting fresh cash into the economy. Such jobs are in aerospace, defense, software development, entertainment, international trade, oil refining and a number of other industries. The article also identifies some of the major reasons underlying this geographic shift in upwardly mobile jobs in the past two decades. One reason is the transformation or metamorphosis of the eighteenth century trading town into the nineteenth century industrial cities. A series of strategies are suggested in this article to reverse this trend and to ameliorate some of the intended and unintended consequences of the decentralization of our metropolitan areas.

Kellis, Mark. **Transportation Links Unemployed City Residents with Training and Jobs**, Community Transportation Reporter, Vol. 7, No. 10, October 1989.

This article explains how the Employment Transportation Service, in conjunction with the Job Training Partnership Act. Section 9 of UMTA, was used to provide needed job training to inner city residents of Hartford Connecticut and to provide transportation to and from employment centers for qualified applicants. The program links the employer with the job-search agency to arrange permanent transportation for the employees. Individuals are also given free rides to and from urban job sites for interviews, plant tours, testing and orientation.

Kuman, R. K. and F. F. Saccomanno. **The Impact of Population Structural Changes on Future Urban Travel Patterns**, ITE Compendium of Technical Papers, August 1985.

This paper attempts to address three structural changes in population that will impact planning and design of future transportation systems. The changes are in the urban population structure in 10-20 years, the implication of these changes for future urban travel, and new policies needed in order to adapt to these structural changes.

Maines, Scott. **The New Breed: Pierce Transit Provides Fully Accessible Service**, Community Transportation Reporter, Vol. 9, No. 5, May/June 1991.

This article addresses the needs and responsibilities for all public and private transit providers to come together in a collective move to provide mass mobility to all classes of citizens without conditions. In this article, Pierce's Transit of Tacoma, Washington, is exemplary of the new, fully accessible breed of transit system specialized in providing shuttle services to the elderly and handicapped.

Margolis, R. and B. R. Price. **The Vital Link: Aging and Community Transportation**, Community Transportation Reporter, Vol. 9, No. 2, February 1991.

This article revitalizes lost mobility for aging Americans who would otherwise be confined to their homes. The article also outlines the extent to which Title III of the Older Americans Act (OAA) has been instrumental in helping the elderly live at home and stay out of the nursing homes.

Mowforth, M. R. N. **Trends in Accessibility to Employment in Greater London-(1971-1981)**, Transportation Planning and Technology, Vol. 13, No. 2, STYBS Limited, February 1989.

This paper reports on an analysis of the trends in accessibility to employment for users of public transportation in Greater London from 1971 to 1981. Indicators of accessibility are calculated for different groups of the workforce in terms of their preparedness to travel and the number and location of jobs in their categories of employment. These are respectively estimated from a cumulative distribution of generalized costs typically borne by each group of workers in the Greater London Transportation Survey (GLTS) area and from Census Employment Data. Substantial changes took place in the structure and location of employment in London between the years of 1971 and 1981.

Najjar, Yaser Mohammad Ali. **Spatial Patterns and Generation of Persons Trips in Middle Eastern Cities: A Case Study**. Thesis (Ph.D. University of Cincinnati, Nattar, January 1987.)

This research examines the spatial patterns of person trips and trip generation in Amman, Jordan. The study accomplished the following tasks: 1) discussed and explained patterns of travel flow between the various traffic zones in the study area, and explored similarities in flow patterns; 2) investigated and explained the factors which influenced the patterns and volume of generated trips. It also formulated a set of person trip models which specified and predicted the functional relationships between generated trips and the locational, demographic, and socioeconomic characteristics of trip makers.

Nowlan, David M. and G. Stewart. **Downtown Population Growth and Commuting Trips: Recent Toronto Experience**, Journal of the American Planning Association, Vol. 57, No. 2, Spring 1991.

This article shows how the rising residential population in the Toronto Central area has served to reduce inbound commuting trips below normal levels. Because of surging housing growth and population intensification, inbound trips have been reduced to approximately 120 during the morning three-hour rush period for each 100 additional dwelling units in the Central area. The article suggests housing policy as a land-use instrument that could help mediate the conflict between continued commercial office growth downtown and the desire to preserve the quality of the downtown residential environment.

O'Hare William and Milton Morris. **Changes in Worktrip Travel Patterns of Transportation Disadvantaged Groups, Demographic Change and Recent Worktrip Travel Trends**, Vols. 1 & 2, Prepared by Joint Center for Political Studies for the United States Department of Transportation for Urban Mass Transportation Administration Cooperative Agreement DC-09-7009, February 1985.

This report examines the work-trip transit trends of demographic groups typically thought to be "transportation disadvantaged." Although there is no universally accepted definition of the term, most analysts would agree that blacks, teenagers, older workers, women, and the poor are among those more often "disadvantaged" for the journey to work, at a rate higher than the national average. These groups are particularly important to planners because public transportation is often the only way members of these groups can get to work.

Pas, Eric I. **The Urban Transportation Planning Process**, Duke University, 1989.

This work highlights the urban transportation planning process. In particular, it focuses on the evolution of this process and serves as an introduction to the quantitative tools that support the planning process. In addition, the author attempts to show how the planning process and modeling and analysis tools have been shaped by changes in societal concerns and the environmental and civil rights movements of the 1960s. On the other hand, the socio-political environment within which urban transportation planning exists is changing and thus shaping the planning process. Finally, future urban travel behavior will be affected by the increasing sophistication of telecommunications for travel. The latter is encouraging employees to live further from work, even beyond traditional suburbs.

Prater, G. S., M. Alexander Jr., and R. M. Williams. **An Analysis of Four Selected State Transportation Coordination Efforts in Social Services & Rural Public Transportation**, Jackson State University, Urban Mass Transportation Administration, UMTA-MS-11-0003-89-1, March 1989.

This research proposes to improve the coordination of specialized transit systems by documenting different systems that have worked effectively, as well as, deciphering any gaps in management and operations in selected systems. The study also explores issues related to barriers, transportation, organization, technical assistance, coordinated transportation, evaluation measures, performance and effectiveness measures, experience and training of agency directors and operating practices.

Regional Plan Association. **Transportation and Economic Opportunity**, Funded through a Federal Grant from Department of Housing and Urban Development, New York, 1973.

This report explains the complex relationship between economic status and access to job opportunities in the New York region. The report points to the lower wage nature of manufacturing employment in areas close to subway stations, and greater recruitment difficulties at plants located at auto-oriented territories. The report summarizes a series of steps needed to bridge the sagging gap between employment centers and residential areas of low income workers.

Reid, J. and E. Thomas. **Dallas Suburban Mobility Strategic Planning**, City of Dallas UMTA-TX-08-9004, Urban Mass Transportation Administration Report, October 1989.

This research depicts selected relationships between employment, population and transportation using a system of equations in a recursion model. The relationship between transportation, central city, and development was also examined. Finally, it develops an econometric model that will depict such relationships.

Research and Policy Committee Development. **The Cost of Unemployment: How Serious? Jobs for the Hard-to-Employ. New Directions for a Public-Private Partnership**, Georgian Press, Inc., January 1978.

This publication examines various costs associated with unemployment and the relative impacts that those costs have on individuals and families, and also, on the gross national product. A closer look at employment statistics suggests that many of the real hardship cases are concentrated among poor black and other low-income families living in inner cities, and among those elements in the youth and older populations who have the greatest difficulty coping with work. Transportation related unemployment is the key issue in this excerpt.

Stommes, E. C. **Reconnecting Rural America**. Report on Rural Intercity Passenger Transportation, Department of Agriculture, July 1989.

This report presents the issues and concerns of those involved in rural intercity passenger transportation throughout the nation. It also summarizes the nine components considered to be the key to development of a national strategy for reconnecting rural America: public-private corporation, mobilization of support, community participation, defined government roles, linking

of services, market research and development, diversification of funding sources, and identification and elimination of barriers. It reiterates the need for coordination and cooperation among those involved in rural passenger transportation.

Texas A&M University and Texas Southern University Consortium. University Transportation Centers Program, DC-11-0018 September 1989.

This project addresses transportation issues and the following research thrust areas: Transportation Effects Upon Transportation; Urban, Suburban, and Rural Mobility; Applications of Computer/Telecommunications Technology; Cost-effective Facility for Safe Operation; State and Regional Transportation Policies and Institutions; and Transportation Logistics.

University of Southern California. Travel Trends in Non-CBD Activity Centers: An Assessment of Potential Roles for Mass Transit, UMTA-CA-11-0032, September 1989.

This research project assesses the ability of both existing transit operations and potential alternative transit programs in satisfying the evolving travel demand patterns that are investigated with respect to the emerging centers based on identified flows within and between those centers. The feasibility of alternative forms of transit is also assessed.

Washington University. University Transportation Centers Program Transportation Synergy for the Northwest, Seattle UMTA-DC-11-0018, September 1989.

This research effort focuses on the optimal allocation and use of resources among modes and intermodal efficiency, given the changing character of supply and demand factors. While rural areas will not be neglected, the main emphasis is on mobility problems and issues in urban and suburban areas, especially those relating to congestion.

B. Energy

Bloch, A. J. **Alternative Fuels For Buses: Current Assessment and Future Perspectives: Final Report**, Polytechnic Institute of New York, Urban Mass Transportation Administration, UMTA-NY-11-0023-84-2, May 1984.

This report examines the issue of alternative fuels for transit buses from the perspective of the 1980s and beyond. It also points out that in a time when federal involvement in alternative fuel development is of lessened significance and market-place actions seem of greater value than government intervention or investment, it is relevant to examine the objectives of developing alternatives to diesel fuel for public transportation vehicle use. Five fuel types were named as possible alternatives for public transit systems: methanol, ethanol, vegetable oils, methane, and hydrogen.

Burwell, D. G., K. Bartholomew and D. Gordon. **Energy and Environmental Research Needs. Transportation, Urban Form, and the Environment. Proceedings of a Conference**, Transportation Research Board, November 1991.

This conference paper identifies a potential research agenda in the area of energy and the environment. The major objective of the conference was to understand how the urban transportation land-use planning and decision making process could be improved to achieve national energy efficiency and environmental objectives while meeting urban mobility needs.

Davis, S. C. and D. B. Shonka. **Transportation Energy Data Book: Edition 10**, Oak Ridge National Laboratory, Department of Energy ORNL-6565, ORNL-5198/Edition 10, September 1989.

This data book represents an assembly and display of statistics and information that characterize transportation activity, and presents data on other factors that influence transportation energy use. The purpose of this document is to present relevant statistical data in the form of tables and graphs on the major transportation modes highlighting the fuel economies, and household data.

Hewings, Geoffrey J. D. **Transportation and Energy**, University of Illinois Press, 1989.

This work explores the link between transportation, location, and energy. Many attempts were made to examine the role that conservation practices in transportation systems could have on reducing the total amount of energy consumed in the nation. However, many of the analyses were flawed, often mistakenly confusing normative and positive analysis. For the most part, the structure of the urban system has not changed to a marked degree in response to the expected outcomes of a sharp rise in energy prices.

Hsiung, S. **Municipality of Metropolitan Seattle Methanol Bus Data Collection Project**, Urban Mass Transportation Administration, UMTA-WA-06-0031, September 1989.

The object of this project is to assist Seattle Metro in the collection, analysis, and documentation of data from methanol buses to examine the safety and cost effectiveness of methanol as a transit bus fuel.

King, R. J. **Household Transport, Energy Conservation and Implication for Urban Policy**, Australian Department of Resources and Energy, (0811-9570) End of Grant Report 394, April 1984.

This project explores the causes and consequences of an apparently increasing movement of lower income households to relatively inconvenient residential locations in Melbourne and the corresponding movement of affluent households. The objectives of the project were: 1) to understand the process underlying household location decisions in Melbourne and thereby accounting for the social distribution of convenience to public transport, education, employment and other services; more specifically, to understand the role of (changing) constraints in process; 2) to understand the consequent (changing) social distribution of car dependence; 3) to develop guidelines for urban policy that would enable less constrained residential location decisions (and to raise the question of whether such decisions would lead to reduced car dependence and lower travel costs relative to income); and 4) to develop guidelines for policies to ameliorate the social effects of transport price on lower income households. At a general level, the study has demonstrated the need to see changing transport use—including changes in modes of travel for the journey-to-work in the context of changing processes of intra urban migration.

Larsen, R. P. **Summary of Economic and Engineering Research at Argonne National Laboratory Supporting Transition To Methanol Fuels For Transportation**, Argonne National Laboratory, CONF-870366-2, 1987.

This paper draws from growing evidence supporting methanol as the preferred alternative transportation fuel for the future. It describes reasons for a transition to methanol, the prevailing attitudes in industry and government toward that fuel, and the initial results of the ANL Cold Weather Methanol Test Fleet Demonstration Program. Interpretations of industry and government attitudes are based on the feed-back gathered at major professional conferences devoted to advance transportation technology and alternative fuels.

Levinson, J., E. Knapp, J. Gonzales, and et al. **Subway Tunnel Energy Study**, Levinson Zaprauskis Associates in conjunction with Parsons Brunckerhoff Quade & Douglas, NY, July 1988.

This report outlines the research results in the Subway Tunnel Energy System (STES) that was conceived by Joel Levinson of Levinson Zaprauskis Associates (LZA), and provides a task by task description of the LZA research process to the point of termination. The research was aimed at reducing the heating and cooling of buildings adjacent to a tunnel, which in the future may reduce energy consumption in the long run by increasing the use of an in-house mass transit system. After the Phase 2 investigation LZA concludes that the STES could not prove cost-effective.

Mid State Regional Planning Agency. **A Transportation Energy Conservation and Contingency Plan for the Mid State Planning Region**, Urban Mass Transportation Administration UMTA-CT-09-0032, November 1982.

This Energy Conservation and Contingency Plan report deals with the problems created by a shortage of motor fuel supplies. The report suggests strategies to alleviate problems created during a fuel shortage such as helping the public cope during a crisis period and implementing strategies to help reduce long-term demand for fuel by reducing consumption in times when fuel supplies are plentiful.

Santini, D. J. and J. B. Rajan. **Comparisons of Emissions of Transit Buses Using Methanol and Diesel Fuel**, Transportation Research Record No. 1255, TRB Publications Office, 1990.

This author suggests that the most likely substitution of methanol-fueled buses for diesel-fueled buses is not likely to result in net air quality improvements for very low-speed bus operations in an urban environment. The purpose of this paper is to facilitate comparison, the emissions test data at idle and in various driving cycles were presented on an hourly of per-mile basis and are ordered by the speed of the test. The emission of specific pollutants from methanol-fueled test vehicles varied greatly with average speed and depended on the engine technology and the emission control devices used.

Small, K. A. **Reducing Transit-Bus Emissions: Comparative Costs and Benefits of Methanol, Particulates Traps, and Fuel Modification**, Institute of Transportation Studies, California University, Irvine, California, March 1988.

This paper investigates the cost effectiveness of three strategies for reducing particulates and sulphur-dioxide emissions from diesel transit buses. The strategies involve low-aromatic fuel, particulate traps, and methanol. The paper also evaluates three alternative indices of optimistic emission controls: one equal to total particulates (including those which formed dioxide); one based on California's ambient air-quality standards; and one based on statistically estimated effects on mortality. The paper concludes that, at the fuel prices considered most likely, methanol is far more costly than other strategies per unit reduction in total particulates. Methanol achieves the greatest absolute emissions reduction.

Totten, M. **Energywise Options For State and Local Government. A Policy Compendium**, Center for Policy Alternatives, Washington, D. C. September 1990.

This document discusses policy options available to state and local governments for achieving energy efficiency. Topics covered include fuel efficient vehicles, transportation control measures (i.e., telecommuting, ridesharing, van pools, car pools, HOV lanes, and parking programs), land-use planning, and public transportation.

C. Environment

Bovy, Philip. **A Traffic Network Oriented Estimation Procedure For Noise Hinderance in Urban Road Traffic: Model and Application**, Delft University of Technology, Report No. 1, February 1987.

This report deals with a procedure for estimating noise impacts to be used for the evaluation of alternative planning actions in cities. In the evaluation stage of transportation and land-use, estimations of road traffic noise impacts intended for planning actions are needed. The method presented in this report builds upon the representation of a transportation network, the built environment, as well as, its use as part of a single integrated segment-oriented spatial information system. The links of the transportation network (or sublinks) are the units to which all information about traffic, buildings, population, and noise are attached. These links are also the units of the acoustical calculation, rather than at coordinate points.

Brand, D. **Research Needs for Analyzing The Impacts of Transportation Options on Urban Form and the Environment**, Transportation Research Board, December 1990.

This conference resource paper presents a paradigm that demonstrates the difficulty of promoting land use patterns that reduce travel in metropolitan areas. The paper provides transportation options to ensure efficiency of future transportation systems. Also included are a list of research needs in this area.

Gray, C. L. Jr. and J. A. Alson. **Moving America To Methanol. A Plan to Replace Oil Imports, Reduce Acid Rain, and Revitalize Our Domestic Economy**, University of Michigan Press, 1985.

This paper proposes that the development of the U.S. Coal-to-Methanol Industry would permit the most cost-effective means of reducing acid rain and would greatly reduce our dependence on imported oil. The paper is aimed at a solution to utilize low-sulfur high-sulfur coal to methanol, for use in a program that would coordinate the transition to methanol as a viable and attractive transportation fuel. The program is expected to increase domestic investment and employment, while significantly reducing record "trade imbalances" and federal budget deficits.

Hall, F. L. and J. D. Welland. **The Effect of Noise Barriers on the Market Value of Adjacent Residential Properties**, Transportation Research Record, No. 1143, 1987.

This research summarizes how highway noise affects house prices and how highway noise barriers alter that effect. The project was performed in Canada by collecting noise data from the property office in the Ontario Ministry of Transportation and Communications and sales data from the Toronto Real Estate Board. All of the data were from three residential areas of Toronto situated behind highway noise barriers. In a multiple linear regression analysis, various other housing characteristics were controlled to determine the variance of coefficient of noise levels. Nonlinear regressions of noise level and functions that ignored noise until it reached the level of 65dB were also investigated. The experiment results supported neither a quadratic function nor any clear threshold effect. From these data results, it is clear that house sales in areas protected by noise barriers reflect the same kind of evaluation of noise as do sales in unprotected noisy areas.

METRO-Dade Transit Agency. **METRO Mover**, Miami Florida Draft is Submitted Pursuant to the National Environmental Policy Act 42, Urban Mass Transportation Administration, UMTA-UGM-20-87-3, July 1987.

This report identifies transportation and environmental impacts of constructing the Omni Leg (1.4 miles) and the Brickell Leg (1.1 miles) of the METRO movers. Impacts are compared with a no-build alternative. The project would increase transportation capacity in downtown Miami improving trips, increasing the mode share of persons trips using transit, and improving circulation and mobility among major activity centers within the study area. It would also adversely affect many bus riders from Miami Beach and the northern corridor, increasing their travel time to downtown, but reducing travel time for METRO bus riders from the west and for METRO rail riders destined for Omni or Brickell.

New York City Department of City Planning. **Final Environmental Impact Statement, Broadway Plaza New York City, NY**, UMTA UGM-20-80-1, November 1980.

This document reports the environmental impacts of and responds to substantive comments received on the fraud of proposed transportation alternatives for Times Square in New York City. The first alternative, known as Broadway Plaza, is a proposed pedestrian/transit mall.

Ogden, K. W. **Truck Movement and Access in Urban Areas**, American Society of Civil Engineers, Journal of Transportation Engineering Vol. 117 No. 1, January 1991.

This paper addresses ways traffic can contribute to a better urban freight system, including ways in which adverse effects can be reduced. Also included are four traffic management solution strategies, which include: 1) measures at a network level; 2) measures at a site level; 3) measures directed at parking and loading; and 4) the removal of physical impediments to mobility.

Parker, J. A. **Does Transportation Finance Influence Urban Form? Transportation, Urban Form, and the Environment**, Transportation Research Board, November 1991.

This conference resource paper discusses the question of whether transportation finance affects urban form. Three sections are examined: 1) considers the inter-relationships of transportation and finance factors on land-use; 2) explores recent experiences with private sector financing and 3) raises questions regarding the allocation of available resources and establishing direction for future research.

Pisarski, A. E. **Overview Transportation, Urban Form, and the Environment**, Transportation Research Board, November 1991.

This conference resource paper focuses on four guiding themes to address the conference topics of housing and jobs, financing, decision making, energy and environment, option and urban design. The themes include: 1) basic understanding and relationships, 2) methodologies, 3) policy and institutions and 4) research recommendations.

Pisarski, A. E. **Transit 2000: Task Force on Public Transit for the 21st Century. Background Paper. The External Environment for Public Transit to the Year 2020. A Specular Assessment**, American Public Transit Association, Washington, D.C., January 1988.

This paper was intended to be used as a context setting document for a larger set of activities regarding the future of public transit. The paper is organized as follows: 1) it identifies what we know in the area of demographics and metropolitan land development patterns; 2) looks at the trends as we understand them and seeks to establish a sense of direction or directions in the diversity of trends and patterns; and 3) speculates on the implications of these directions.

Plowden, S. **Present and Potential Role of Appraisal Techniques in Achieving a Balanced Transport Policy**, Oxford University, England Transport Studies Unit, October 1989.

This paper outlines a broad approach for rational transport policy. The transport policy should provide good access to other people and facilities while minimizing the need to travel, specifically the need to use a car.

Porter, D. R. **Regional Governance of Metropolitan Form: The Missing Link in Relating Land-Use and Transportation. Transportation Urban Form, and the Environment**, Transportation Research Board, December 1990.

This conference resource paper addresses how land-use and transportation decisions are made and how these processes and procedures will inevitably impact the form and character of metropolitan development.

Rosenke, D. and G. Stitz. **High-Efficiency Physical Noise Abatement System For a METRO Tunnel**, Verkehr un Technik, Vol. 41, No. 2, February 1988.

This report documents the proceedings of the suspended mass system implemented in Hanover METRO to reduce noise while preliminary research, specifications, and work were carried out.

Stubbs, B. **Noise and Vibration From Under Ground Railways**, Noise and Vibration Control Worldwide, Vol. 7, No. 10, November 1986.

This report denotes the impact of vibration caused by the wheel/rail interaction transmitted through rock to the foundations of nearby buildings. It also states, however, that the level of vibration may be perceptible as a mechanical motion and may cause a low frequency rumble to be heard. It states, however, that the level of vibration from intermittent underground trains will not normally be sufficient to cause any structural damage to buildings, or even to produce discomfort from the sensible vibration. It is the noise generated by vibration of building components which can cause problems, especially in buildings such as theaters, concert halls and recording studios.

Stutz, Frederick P. **Environment Impacts**, San Diego State University, U.S. DOT, US Government Printing Office, 1987.

This report explains the special treatment given to the environmental review process and the evaluation of environmental impacts in a benefit/cost framework. Further, this article states that

noise is one of the factors categorized in the environmental impacts. However, the four major effects of traffic noise having been identified as a complex phenomenon described as sleep interference, speech interference, annoyance, and the impairment of hearing that comes from long exposure to high noise levels. This article further discusses how the proposed project would change neighborhoods or community cohesion for various groups.

Transportation Research Board. **Environmental Research Needs In Transportation**, Transportation Research Board Publications, Washington, D.C., March 1992.

This circular explores 29 problem statements for transportation research. The statements are categorized in fourteen environmental areas and prioritized within each area by persons that attended a workshop held in Denver in November of 1991. The statements are suggested as guidance to financial sponsors, research institutions, industry, the academic community, and others, in allocating scarce resources for the development of functional solutions to environmental areas.

Urban Mass Transportation Administration (Maryland). **Northeast Extension of the Baltimore METRO**, Baltimore, Maryland, UMTA, FHA UMTA-UGM-20-87-2, Final EIS Submitted Pursuant to the National Environmental Policy Act 42 U.S. C4332 (2), October 1987.

This document addresses the speed for increased accessibility from Baltimore's Northeast corridor to METRO Center, as well as, linking areas currently served by METRO to the major employment center at John Hopkins Hospital. The document also examined several potential areas of impact including transportation, land-use, air quality, noise and vibrating parklands, and construction.

D. Land Use

Bourne, R. T. and P. Schauer. **Case Study in Land-Use and Parking Regulations in Support of Campus Transit Services: Development of Cy-Ride in Ames, Iowa**, Transportation Research Board, November 1990.

This paper highlights the benefits and success of a cooperative effort between the City of Ames, the University of Iowa and university students in the implementation of a fixed- route and demand responsive transit service. The paper goes into an in-depth discussion of the recognized relationships between land-use, parking and transit. In summary, aggressive land use and innovative parking policies are only partial factors in building a strong transit service; the actual management and approach to operations are the final links in a successful campus transit service.

Bowes, W., M. Gravel, and G. Noxon. **The Role of Transit in the Subdivision Design and Approval Process**, Delcan Corporation, Transportation Association of Canada, September 1990.

This paper suggests strategies for accomplishing more "transit-friendly" design by emphasizing and improving transit's role at the provincial policy, municipal and subdivision planning levels, and through improved education and communication between all parties.

Brown, W. F. and E. Weiner. **Transportation Planning Applications: A Compendium of Papers Based On A Conference Held in Orlando, Florida**, Technology Sharing Program Research and Special Programs Administration, Washington, D. C., December 1987.

This conference resource paper discusses important issues identified at the National Conference of Transportation Planning Applications, held April 20-24, 1987. Emerging issues included: urban transportation planning is no longer solely long-term and regional; the age of the microcomputer has arrived bringing with it changes in economic planning; budget and funding constraints have limited planning agencies from obtaining large-scale regional data; the quality of demographic and economic forecast; development of integrated analyses between planning and project development; presentation of analysis results to public officials; and quick response and default applications with little understanding of the appropriateness of the application.

Cervero, Robert. **America's Suburban Centers: A Study of the Land Use-Transportation Link**, University of California-Berkeley Institute of Transportation Studies Berkeley, California Prepared for UMTA Office of Policy and Budget and Rice Center, Joint Center for Urban Mobility Research, Houston, TX, January 1988.

This report explores the evolution of suburban employment centers, and their implications for transportation infrastructure planning. The report uses transportation and employment data from 57 centers in 26 of the nation's largest metropolitan areas to identify five characteristic kinds of development. The kinds of development included office parks, office centers and concentrations, large scale mixed-use development, moderate sized developments sub-cities, and large scale office growth corridors.

Cervero, R. **Land-Use Mixing and Suburban Mobility**, Transportation Quarterly, Vol. 42, No. 3, July 1988.

This paper examines the potential mobility benefits of developing mixed suburban workplaces where offices, shops, banks, restaurants, and other activities are built side-by-side. Suggestions are made on how mixed use developments could be encouraged in suburbia through various zoning and tax policy initiatives. The advantages of mixed-use developments are noted, as well as, the land-use composition of suburban job centers.

Davidson, D. **Impact of Suburban Employee Trip Chaining on Transportation Demand Management**, Transportation Research Board, November 1991.

This document reports findings on suburban commute trip-chaining. The findings are part of a broader study to assist in the design of Transportation Demand Management (TDM) strategies. Based on data collected from over 1,800 employees at 42 cities, suburban employees rely heavily on their vehicles to gain access to everyday services. The data also reveals that employees expressed a legitimate need for access to a vehicle during the day, which inevitably results in present and future deterrents to ridesharing. The result is that readily available access must be made to provide convenience shopping, banking, child care and dry cleaning services to fully support the ability to regularly use a shared-ride mode. Policy proposals and recommendations are made to minimize the negative and maximize the positive impacts of linked trips, specific recommendations are made to better mix land uses for the delivery of services to employer sites. Overall, it appears that in order to implement behavioral changes in trip making to lessen suburban travel demands, it is necessary to implement a system of incentives and personalized attention rewards.

Deakin, E. A. **Jobs, Housing and Transportation: Theory and Evidence on Interactions Between Land-Use and Transportation.** Transportation, Urban Form, and the Environment, Transportation Research Board, November 1991.

This conference resource paper addresses the demand for transportation as determined by land-use and demographics. The primary emphasis is on issues involved in connecting origin with destination. The paper discusses transportation-land-use theory, reports key findings from empirical studies on land-use and urban development impacts of transit and highways and concludes with a discussion of research needs.

Deakin, E. A. **Suburban Traffic Congestion, Land-Use and Transportation Planning Issues: Public Policy Options,** Transportation Research Board, July 1990.

Within this paper transportation and land-use planning issues are raised about suburban congestion and assesses the public policy directions that might be pursued. Also included in the paper is a brief discussion of future directions.

Deakin, E. A. **Transit 2001: Task Force on Public Transit for the 21st Century, Background Paper. Issues and Opportunities for Transit: An Exploration of Changes in the External Environment and Land-Use and Development Trends,** American Public Transit Association, January 1988.

This paper highlights historical contributions of public transportation and identifies future concepts that need be addressed in order to continue and improve public transportation service, particularly in urban areas.

Deakin, E. A. **Transportation and Land Development Research Needs and Recommendations for Action,** Transportation Research Board, July 1990.

This publication suggests that a better understanding of four areas of research could improve understanding of land-use and transportation. The areas include: 1) physical planning strategies; 2) understanding travel demand; 3) utility and implications of new technologies; and 4) organizations, institutions, and the framework of decision-making. Having a better understanding of factors associated with these areas would also help guide public policy development.

Edwards, J. D., Jr. **Traffic and Land-Use Planning and the Decline of the Central Business Districts**, Institute of Transportation Engineers Journal, December 1991.

This paper presents the causes of decentralized land use development patterns. The bypass construction and down deterioration are the focus of this article. It was highly recommended that transportation engineers carefully consider the total impact of highway improvement.

Fitzpatrick, K. and T. Urbanik II. **Summary of Guidelines for Bus-Related Street Improvements**, Institute of Transportation Engineers Journal, Vol 61 No. 11 pp 17-21, November 1991.

This report summarizes the findings of a study which involved the survey of current practices, and the development of guidelines for considering bus-related street improvements. The departmental personnel of state departments of transportation and metropolitan transit authorities were the target audience. The findings were tabulated which covered the service criteria and service areas that encourage land-use and development patterns that are conducive to efficient bus service support facilities, such as stops and passenger amenities.

Garreau, J. **Edge City: Life On The New Frontier: Travel Trends In Non-CBD Activity Centers**, Southern California University, Urban Mass Transportation Administration, UMTA-Ca-11-0032-89-1, April 1989.

Garreau examines the relationship between dispersed activity centers and the rest of the metropolitan area, and the provision and performance of conventional and paratransit service for the subcenter. It also suggests appropriate transit service and policy innovations. Los Angelization, the movement of people, jobs, residences and other activities away from the CBD, is being replicated across the nation. The research also centers around the unclear understanding of the interaction of the land and travel market that is generating such spatial arrangement. There are new kinds of cities, which he refers to as "Edge Cities". Edge cities defined as cities that no longer resemble old downtown and they meet none of our preconceptions of what constitutes a city. He goes on point out how these new Edge cities have dramatically changed every aspect of how we live, specifically our homes, our transportation, our jobs and our social lives.

Gordon, S. P. and J. B. Peers. **West Pedestrian Pocket**, Transportation Research Board, Transportation Research Board Publications, Washington, D. C., November 1991.

This document focuses on reducing automobile use at suburban activity centers. At sites where nonautomobile alternatives are inferior and parking is plentiful, mode choice for work, shopping, recreational, and linked trips can be influenced to a limited extent. The findings are key design features including concentration of commercial, shopping, and office uses in a town center that is surrounded by high-density residential neighborhoods and large public spaces. The final analysis of the potential for reducing automobile use indicate that project design alone may result in average daily vehicle-miles travelled reduction of 20 to 25%, and up to 15% in the peak hour alone, which are based on travel patterns and mode splits typically associated with suburban activity centers of standard design.

Gray, G. E. and L. A. Hoel. **Public Transportation**, Prentice-Hall, Incorporated, May 1992.

This author discusses the new societal values and priorities as related to public transportation. In this book, Public Transportation is divided into seven parts: historical development; systems and technologies; comparing alternatives; planning; management and operations; policy considerations; and the future. Some of the new topics include: Should transportation reinforce existing life-styles, or should it encourage change in life-styles? Who should pay for transit service-the user, the local taxpayer or the national taxpayer? How can we optimize air quality improvement, energy use, land use and transportation modes to provide needed mobility at least cost and how can we coordinate service and transportation systems management elements to make them more effective and efficient?

Guiliano, Genevieve. **Land Use Impacts of Transportation Investments: Highway and Transit**, Geography of Urban Transportation, The Guilford Press, New York, 1986.

This paper describes the conceptual relationship between transportation and land use in the context of accessibility. Further, it attempts to describe those factors that must be considered when examining land-use impacts on transportation changes. The major land use and transportation theories and models that have been in transportation policy analysis reveal several discussions of difficulties concerning transportation planners' experience in predicting the impact of transportation investments on land use. But, because transportation investment affects relative accessibility

within the region, long-run changes in land use (such as shifts in travel origins and destinations) should occur in response to those key considerations in evaluating alternative transportation investments.

Guiliano, Genevieve. **Theories of Land-Use/Transportation Interaction, Landuse Impacts of Transportation Investments: Highway and Transit**, The Geography of Urban Transportation, Edited by Susan Hanson, The Guilford Press, 1986.

This report attempts to explain the effects of transportation cost on location decision making, and points to a set of behavioral or casual relationships that describe location decision in terms of the factors determining such decisions.

Lockwood, S. C. **Suburban Congestion and Implications for National Policy**, Transportation Research Board, July 1990.

This paper explores the emerging generic strategy for suburban congestion management. Three stages are included in the strategy: 1) immediate action to provide congestion relief through short-term, low cost supply and demand tactics; 2) mid-term action to moderate growth rates to enable supply improvements to catch up with demand; and 3) long-term action to develop new supply improvements to balance at higher levels. Discussion also includes the implementation of this strategy and the framework necessary for its consideration.

Lomax, T. **An Evaluation of Strategies for Improving Urban Transit Efficiency**, Texas Transportation Institute Texas A&M University, September 1990.

This research project proposes to evaluate the energy efficiency of auto, local bus service, park and ride and rail transit under the densities and land use activity patterns prevalent in Texas and surrounding southern and western urban areas. Inclusive in the report is data from cities in Texas, the U. S. and applicable foreign cities, extensive literature reviews and transportation planning models.

Mass Transit. **A City Reborn**, Mass Transit, Vol. 16, No. 6, June 1989.

This report discusses the exodus of residents and retail business from the city center to the suburbs in the 1960s. This led to Jacksonville becoming a congested city center for employees who commuted via automobile requiring more parking spaces. Mass transit was ruled out as a viable alternative, but a VAL system dubbed the "Automated Skyway Express" has proven to be a viable alternative. This solution has relieved some of the congestion in the city, which shifted public opinion to the positive side and brought retail development back into the city center. Plans are under consideration to extend the VAL.

May, J. and G. Scheuernstuhl. **Sensitivity Analysis for Land Use, Transportation** Research Board Publications, Washington, D. C., November 1991.

This paper presents a comparative analysis on air quality of a high-density alternative land use scenario that concentrates on a high percentage of the employment growth. May reports that the employment growth between 1989 and 2010 will come from the lower-density suburban development typical in the Denver region. The high-occupancy vehicle lane system was substituted for other freeway improvements proposed as part of the regional transportation plan. In result, air quality was not improved, because of the regional employment growth along transit corridors concentration from 1989 to 2010.

Mullin, J. A. III, Earl J. Washington, Robert W. Stokes, et al. **Land-use Impacts of the Houston Transit Way System. Third Year Update**, TTI in cooperative with DOT, UTMA, February, 1988.

This report provides a third year update of research performed under project 2-10-85-1086 between the State Department of Highways and Public Transportation and TTI. This five year research effort examines transportation and land-use impacts resulting from implementation of an extensive priority system of busways (transitways) and park-and-ride facilities in Houston, Texas. Over the duration of this research, four (HOV) lanes with supporting park-and-ride facilities will be placed in operation in the Houston North I-45N and Katy I-10W freeway corridors. The impacts resulting from three of the HOV treatments I-45N and I-10W are the objects of this research.

Newman, P. and J. R. Kenworthy. **Transport and Urban Form in Thirty-Two of the World's Principal Cities**, Transport Reviews, July 1991.

This paper presents research finding of a study of 32 major world cities. The findings clearly indicate that there is a significant relationship between transport and urban form.

Porter, D. R. **Regional Governance of Metropolitan Form: The Missing Link in Relating Land-Use and Transportation. Transportation Urban Form and the Environment**, Transportation Research Board, December 1990.

This conference resource paper addresses how land-use and transportation decisions are made and how these processes and procedures will inevitably impact the form and character of metropolitan development.

Pratt, R. H. **Planning Solutions--TDM and Beyond**, Transportation Research Boards, July 1990.

This document addresses the planning solution issue: Can we successfully utilize transportation planning to resolve and avoid suburban traffic congestion? The proposed question is answered in two parts. The first part addresses the efficacy of planning solutions, most specifically Travel Demand Management (TDM). The second part explores responses to the TDM limitations identified in the first part. Inclusive in the report are three major categories of traffic mitigation needs, including: 1) transportation infrastructure, 2) manageable infrastructure, and 3) land use innovation.

Puskarev, B. and E. L. Thomas. **Transit Access, Land Value and New Financing Mechanisms**, Urban Mass Transportation Administration, Performing Agency: Regional Plan Association, New York, August 1988.

This report provides the techniques to study the relationship between transit accessibility, land development, and property values. The study also developed a technique for measuring the benefits of transit accessibility to land owners and developers. The objective of the project was to provide assistance to the Regional Plan Association in the New York Metropolitan area research and planning program. The techniques derived from this study will be applied in Manhattan as a way to access new financing mechanisms for the New York Transit System and will be applied nationwide.

Putman, S. H. **Mathematical Programming Formulations of Transportation and Land Use Models: Practical Implications of Recent Research**, Transportation Research, Record No. 1125, 1987.

This paper presents simple numerical examples of trip assignment and population locations, both described as optimization problems in mathematical programming formulations. It also transforms the liner model that incorporates dispersion of location due to differences in locator's preference or perceptions. It then shows how the trip assignment model and location model can be combined into a single non-linear programming formulation that solves both problems simultaneously.

Rabinowitz, H., E. Beimborn, and et al. **The New Suburb. Final Report**, Wisconsin University Center for Transportation Studies, Urban Mass Transportation Administration Technology Sharing Program, July 1991.

This report provides an examination of the historical basis for the suburbs and analyzes recent trends and proposals for new suburban development, specifically as related to public transportation. In the report, two groups of projects are examined: 1) a group of ten "exemplars" that represent a trend toward more concentrated development and mixed land use, and 2) an analysis of a group of projects that are entries to the International City Design Competition. In group one, examples are provided and analyzed for their transit service potential. For the second group over 250 competition entries were analyzed, the results indicated that a limited number of entrants used transit as a planning factor. In summary, the analysis yields two particularly significant findings: 1) there are few trends in the planning and design of suburban areas that are promising prospects of public transit, and 2) the state of the art and understanding of transit is limited among planners, developers and local elected official, who are critical in land development decisions.

Sarkar, S. L. **Effect of Blaine Fineness Reversal on Strength and Hydration of Cement**, Pergamon Press, Incorporated, Cement and Concrete Research Vol. 20 No. 3, May 1990.

Investigated in this paper are the effects of Blaine fineness reversal on the strength of mortar made from two cements and determining the factors influencing their strength of development patterns.

Sussna, S. **Land Use Regulation and Financing Transportation Improvements**, Eno Transportation, Incorporated, Transportation Quarterly Vol. 44 No.3, July 1990.

This paper addresses the issue of effective mitigation of anticipated adverse traffic impacts. In this article some recent cases that deal with the issue of traffic impact fees and other possible remedies for financing transportation improvements are analyzed. Recommendations are made utilizing a multi-faceted analysis from legal, planning, financial and political viewpoints.

Valdez, R. L. Wesemann, L. Edson, and L. J. Glazer. **Suburban Activity Center Transportation Demand Management Market Research Study**, Transportation Research, Record No. 1170, 1988.

This report explains the background and findings of a study designed to assist in planning and implementing Transportation Demand Management (TDM) strategies at a major suburban activity center. The results were based on a representative sample of all employers in the activity center with six or more employees. Three survey instruments were developed for the study: an employee questionnaire, an employer questionnaire, and a senior management survey. The findings suggest that major opportunities exist to improve mobility through implementation of TDM measures.

Vander Lugt, R. D. and S. Virkar. **Coordination of Transportation Planning and Land-Use Controls: A Challenge for Virginia in the 21st Century**, Virginia Transportation Research Council, Virginia Department of Transportation, June 1991.

This paper covers an in-depth look of the public power which is exercised by the city and county officials in Virginia. The Commonwealth of Virginia is the primary controller over the location and characteristics of transportation facilities. Specifically, the paper includes a study on the development of Northern Virginia experienced in the 1980's. There were six areas of inquiry: 1)

intergovernmental relations; 2) the transportation planning process; 3) land use control; 4) tools for coordination; 5) impediments to effective coordination and 6) the laws and practices of other selected regions.

Washington, E. J. and R. W. Stokes. **Planning Guidelines for Suburban Transit Services. Final Report**, Texas Transportation Institute, Texas A&M University College Station, Texas State Department of Highways & Public Transportation; Urban Mass Transportation Administration Office of Planning, Washington, D.C., August 1988.

The focal point of this paper was to develop a set of general guidelines or procedures to assist transit service planners in planning, designing and implementing route and service changes to capture a larger share of the regional travel market.

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