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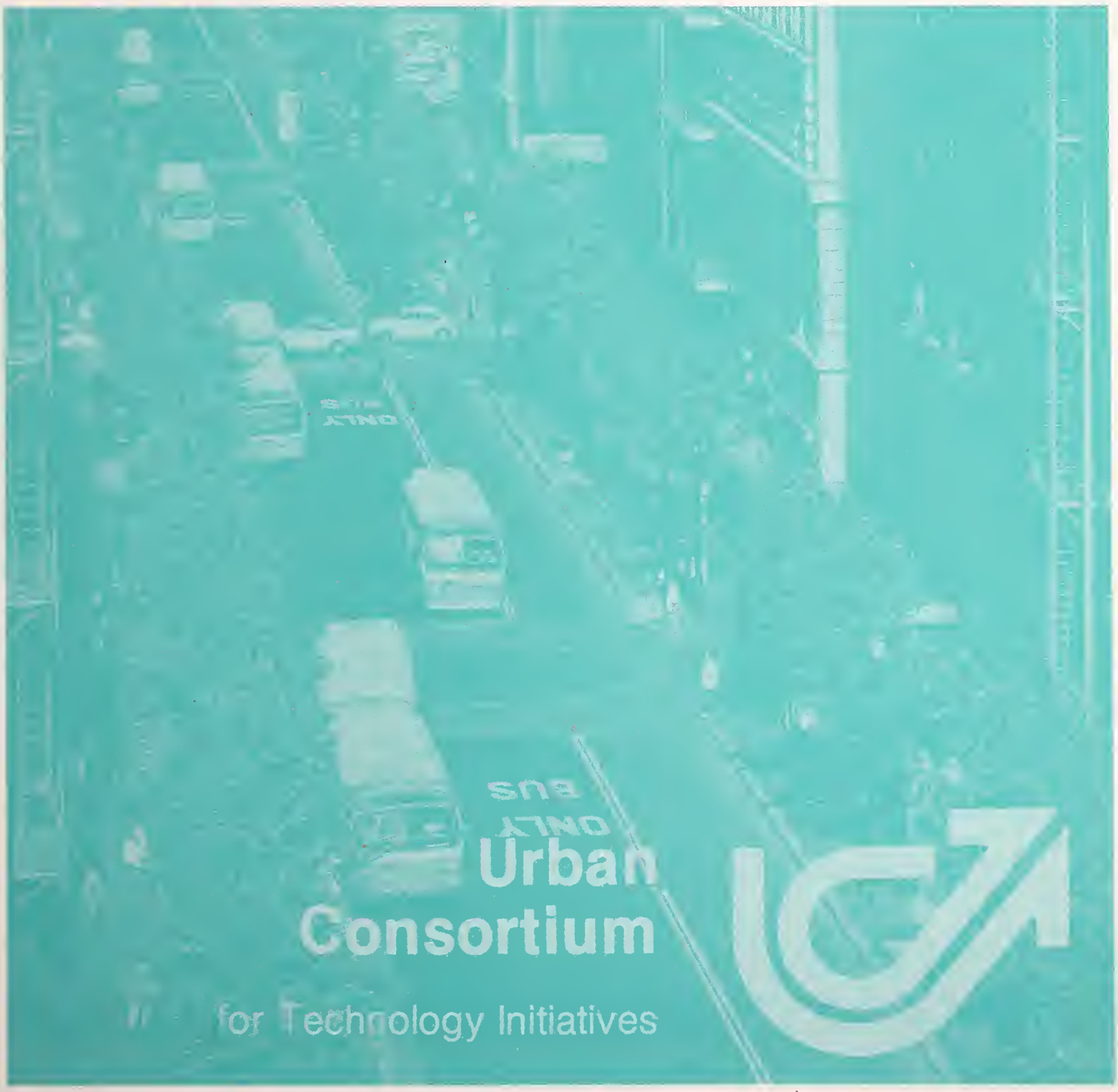
Intercepting Downtown-Bound Traffic

June 1982

An Urban Consortium Information Bulletin



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The Urban Consortium for Technology Initiatives was formed to pursue technological solutions to pressing urban problems. The Urban Consortium is a coalition of 37 major urban governments, 28 cities and 9 counties, with populations over 500,000. These 37 governments represent over 20% of the nation's population and have a combined purchasing power of over $25 billion.

Formed in 1974, the Urban Consortium represents a unified local government market for new technologies. The Consortium is organized to encourage public and private investment to develop new products or systems which will improve delivery of local public services and provide cost-effective solutions to urban problems. The Consortium also serves as a clearinghouse in the coordination and application of existing technology and information.

To achieve its goal, the Urban Consortium identifies the common needs of its members, establishes priorities, stimulates investment from Federal, private and other sources and then provides on-site technical assistance to assure that solutions will be applied. The work of the Consortium is focused through 10 task forces: Community and Economic Development; Criminal Justice; Environmental Services; Energy; Fire Safety and Disaster Preparedness; Health; Human Resources; Management, Finance and Personnel; Public Works and Public Utilities; and Transportation.

Public Technology, Inc. is the applied science and technology organization of the National League of Cities and the International City Management Association. It is a nonprofit, tax-exempt, public interest organization established in December 1971 by local governments and their public interest groups. Its purpose is to help local governments improve services and cut costs through practical use of applied science and technology. PTI sponsors the nation's local government cooperative research development, and technology transfer program.

PTI's Board of Directors consists of the executive directors of the International City Management Association and the National League of Cities, plus managers and elected officials from across the United States.

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Secretariat to the
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PREFACE

This is one of ten bulletins in the fifth series of Information Bulletins produced by the Transportation Task Force of the Urban Consortium for Technology Initiatives. Each bulletin in this series addresses a priority transportation need identified by member jurisdictions of the Urban Consortium. The bulletins are prepared for the Transportation Task Force by the staff of Public Technology, Inc. and its consultants.

Ten newly identified transportation needs are covered in this fifth series of Information Bulletins. In priority order they are:

- Growth Management and Transportation
- Intercepting Downtown-Bound Traffic
- Inflation Responsive Transit Financing
- Impact of Traffic on Residential Areas
- Coordination of Parking with Public Transportation and Ridesharing
- Improved Railroad Grade Crossings
- Flexible Federal Design Standards for Highway Improvements
- Traffic Signal Maintenance
- Inflation Responsive Financing for Streets and Highways
- Flexible Parking Requirements

The needs highlighted by Information Bulletins are selected in an annual process of needs identification used by the Urban Consortium. By focusing on the priority needs of member jurisdictions, the Consortium assures that resultant research and development efforts are responsive to local government problems.

Each bulletin provides a nontechnical overview, from the local government perspective, of issues and problems associated with each need. Current research efforts and approaches to the problem are identified. The bulletins are not an in-depth review of the state-of-the-art or the state-of-the-practice. Rather, they serve to identify and raise issues and as an information base from which the Transportation Task Force selects topics that require a more substantial research effort.

The Information Bulletins are also useful to those, such as elected officials, for whom transportation is but one of many areas of concern.

The needs selection process used by the Urban Consortium is effective. Priority needs selections have been addressed by subsequent Transportation Task Force projects:

- To facilitate the provision of transportation services for elderly and handicapped people, five products have been developed: Elderly and Handicapped Transportation: Chief Executive's Summary, Elderly and Handicapped Transportation: Planning Checklist, Elderly and Handicapped Transportation: Information Sourcebook, Elderly and Handicapped Transportation: Eight Case Studies.

- To help improve center city circulation (with the objectives of downtown revitalization and economic development) several projects have been completed. A summary report on Center City Environment and Transportation: Local Government Solutions shows how 7 cities use transportation and pedestrian improvements as tools in downtown revitalization. A report titled Center City Environment and Transportation: Transportation Innovations in Five European Cities discusses exemplary approaches to resolving traffic management problems common to cities with large numbers of automobiles. Another project, addressing the coordination of public transportation investment with real estate development, has culminated in two major national conferences--the Joint Development Marketplaces I and II. The second Marketplace, held in Washington, DC, in July 1980, was attended by a total of over 500 people, including exhibitors from 32 cities and counties and representatives of private development and financial organizations.

- A series of documents relating to the need for Transportation Planning and Impact Forecasting Tools has been prepared: (1) a management-level document for local officials describing manual and computer transportation planning tools available from the U.S. Department of Transportation, (2) a series of case studies of local government and transit agency applications of these tools, and (3) a guide describing ways local governments can gain access to these tools.

- To meet the need to promote the use of Transportation System Management (TSM) measures, a series of five regional meetings was held in 1980 to provide local, State, and Federal officials, and representatives of transit agencies and the business community with the opportunity to exchange information about low-cost TSM projects to improve existing transportation systems.

- To facilitate the dissemination of information on local experiences in Parking Management, a technical report describing the state-of-the-art has been prepared.

- To address the need for information on transit productivity, a seminar on International Transit Performance Measurement was held in September 1980. The seminar included presentations on the state-of-the-art in France, Germany, and the United States. The seminar was co-sponsored by the German Marshall Fund of the United States.

- To encourage improved design in transportation facilities, PTI organized Design for Moving People, the first national conference to bring together leading design professionals--architects, artists, arts administrators--and those responsible for operating and managing many of the nation's largest public mass transportation systems. The meeting was held in May 1981 in New York. Cosponsored by the American Public Transit Association (APTA), the New York Chapter of the American Institute of Architects, AMTRAK, and the Municipal Art Society of New York, the two day conference featured keynote addresses by two of the country's leading architects, case studies, and practical workshops on topics such as financing design excellence, promoting better collaboration between architects and artists, and materials selection--vandalism and maintenance.

- To address the issue of adequate financing for transit and the difficult policy decisions facing operating authorities regarding fare setting and the role fares should play in meeting financial needs, the Urban Mass Transportation Administration (UMTA) and the American Public Transit Association (APTA) sponsored a fare policy seminar, with the help of PTI, for general managers and board members in Region III. The seminar was held in Washington, D.C. in September 1981, at APTA's offices. Consulting experts presented the results of relevant research sponsored by UMTA's Office of Service and Methods Demonstrations.

- To test the effectiveness of the video teleconference as a means of communicating information to local officials quickly and efficiently and to address the need to find less costly alternatives to fixed route transit, PTI organized and staffed a successful teleconference under UMTA sponsorship in 1982. Entitled "Adjusting to Reduced Transportation Budgets: Operational Strategies," the teleconference provided local officials in five cities with information about alternative transportation services suitable for areas where conventional transit service is either impractical or unduly expensive.

Task Force information dissemination and technology sharing concerns are currently addressed by three products--SMD Briefs, Transit Actions and Transit Technology Briefs. SMD Briefs are short reports that provide up-to-date information about specific aspects of on-going projects of UMTA's Office of Service and Methods Demonstrations (SMD). In addition, the SMD HOST Program allows transportation officials from selected jurisdictions to visit one of these projects for on-site training. Transit

Actions cover the on-going projects of UMTA's Office of Transportation Management. Each Action provides timely information that will be especially useful to transit managers concerned with improving their transit systems' efficiency and effectiveness. Transit Technology Briefs report on projects sponsored by UMTA's Office of Technology Development and Deployment. These timely documents provide information that should be of direct benefit in the improvement and productivity of transit system operations.

Additional Technology Sharing occurs through the National Cooperative Transit Research Program (NCTRP) which was organized jointly by Public Technology, Inc., the American Public Transit Association, the Urban Mass Transportation Administration, and the Transportation Research Board to address problems relating to public transportation identified by local and State government and transit administrators.

The support of the U.S. Department of Transportation's Technology Sharing Division in the Office of the Secretary, Federal Highway Administration, National Highway Traffic Safety Administration, and Urban Mass Transportation Administration has been invaluable in the work of the Transportation Task Force of the Urban Consortium and the Public Technology, Inc. staff. The guidance offered by the Task Force members will continue to ensure that the work of the staff will meet the urgent needs identified by members of the Urban Consortium for Technology Initiatives.

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Chapter 1

INTRODUCTION

Traffic congestion in the central business district (CBD) costs time and money, frazzles nerves, wastes gasoline, and pollutes the air. Recognizing this, the Transportation Task Force of the Urban Consortium designated Intercepting Downtown-Bound Traffic as a priority subject area for research in 1981. Reducing CBD traffic congestion should have two broad benefits:

- Healthier and more livable cities. Reducing or discouraging unchecked vehicular use in downtown areas may be a key step in revitalizing the downtown area economically, aesthetically, and environmentally.

- Improved transit service efficiency. Transit agencies, whose services could ease congestion, are either hampered in doing so by the congestion itself or have inadvertently contributed to it in the past by concentrating service to and within the downtown with radial routing policies.

A traffic intercept is a new term for a technique or set of techniques aimed at reducing the volume of traffic trying to reach downtown. The concept allows for consolidating regional travelers by their destinations at points outside of the downtown and providing transit service accordingly. It permits:

- Automobile users to park their cars conveniently outside of the downtown and board service that takes them where they want to go, presumably with fewer hassles and at less expense.

- Transit users whose destinations are somewhere outside of the downtown to avoid the nuisance of coming all the way downtown to transfer.

- Transit agencies to eliminate some of the service that is needlessly coming downtown and provide a different kind of service downtown, using smaller or more energy-efficient vehicles, that is better suited to the level and type of demand.

- Cities to enjoy the benefits of less congestion.

While traffic intercepts may be most commonly thought of as only those facilities and measures that restrict traffic at the immediate edge of downtown, members of the Transportation Task Force believe that cities need to look beyond the edge of downtown to deal with the problem of excessive traffic converging on central business districts.

They also believe that intercepting downtown-bound traffic requires that alternative transportation options be implemented so that displaced travelers can still reach their destinations conveniently. The intent of intercepting downtown-bound traffic is not to discourage people from coming downtown but to reduce traffic congestion so that the downtown is more appealing.

Therefore, parking management programs, transit and pedestrian malls, transit centers, park-and-ride programs, CBD shuttles, traffic restrictions, ring roads and bypasses, traffic circles or diverters, preferential lanes, bus schedule and route restructuring -- all these may intercept traffic, directly or indirectly. They will have the greatest impact on reducing downtown congestion, however, without discouraging downtown use, when they are combined in a comprehensive, complementary strategy.

This Information Bulletin will discuss the issues associated with individual intercept techniques, as well as those associated with the concept as a whole. Although there are well over 100 projects in the United States that restrict automobile access in parts of the downtown, primarily with transit and pedestrian malls, very few are the result of a comprehensive strategy to manage downtown traffic. The institutional coordination, financial investment, and sheer manpower required by such an effort, as well as the multitude of downtown interests that steadfastly oppose any move to restrict vehicular access, make it difficult to pursue a strategic approach. Further, the strategy must be planned and designed within the context of a well-defined and widely-supported set of long-term urban goals. While these may be agreed upon in principle, there often is disagreement about the best way of carrying them out.

Chapter 2

ISSUES AND PROBLEMS

The three main elements of an intercept strategy are the location and design of intercept facilities, the downtown circulation system, and the management of the automobile. Each element has its own issues and options.

INTERCEPT FACILITIES

An intercept facility may be a bus stop, a park-and-ride lot, a simple transit center with sawtooth bus bays, a subway or light rail station, or a multimodal terminal. It functions to intercept vehicles outside of the downtown. Here automobile drivers may deposit their cars or transit riders leave their regional or suburban transit lines to transfer to the service that will take them downtown or to another regional line that will take them to their destinations outside of the downtown.

Locating Intercept Facilities

Most urban centers have traditionally had one primary focus of automobile trips and transit service--the downtown. Many cities are now attempting to identify regional centers at the edge of the downtown or further out and provide these with intercept facilities to reduce the use of the downtown as the major parking and transfer center.

In a full-fledged intercept facility-based transit network, such as those that Denver, Portland, and Seattle are developing, there may be intercept facilities at suburban malls or other activity centers away from the downtown. These will serve the local patrons and provide service to other intercept facilities closer in such as those at a transit or pedestrian mall in the downtown. In less complex networks, there may be a set of intercept facilities at the periphery of downtown, connected by a transit loop that provides downtown circulation and from which radial service to outlying areas fans out. Toledo is just completing such a loop. Another option to reduce congestion may be a downtown transit or pedestrian mall anchored by facilities that intercept regional service.

A University of Washington Study, funded by the Urban Mass Transportation Administration (UMTA), sets forth the following guidelines for evaluating alternative intercept facility, or transit center,

locations.[1] The study looked mostly at how to locate and size regional rather than downtown intercept facilities, but the guidelines are useful in both cases.

- Intercepts should be located in areas that currently generate substantial activity throughout the day to serve the direction as-well as destination-oriented traveler.

- They should be located at well-known locations so that the intercepts can become identified with these familiar places.

- The intercepts should be easily accessible from a freeway or major arterial to facilitate efficient operation.

- For a multi-intercept network, one intercept should be allocated to every identifiable population cluster or community.

- Regional intercepts should be spaced four to eight miles apart, assuming an average bus speed of 25 miles per hour between them. Intercepts spaced too close together may result in overlapping service, and those too far apart will make travel times between them too long to schedule reliable, coordinated transfer service.

- The intercepts should be located to provide riders with direct, safe access to the various elements of the activity center.[2]

A list of factors to consider when locating intercept facilities is provided in Table 1.

Technical planning tools exist to aid with facility location as part of total transportation system planning. The Urban Transportation Planning System (UTPS)[3] is the most commonly known. It offers two sets of tools:

- UTPS Simplified Aids, which are manual techniques consisting of equations, graphs, and curves for forecasting or estimating project or policy impacts.

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1 Another important study by Professor Vukan R. Vuchic from the University of Pennsylvania's Department of Civil and Urban Engineering is also available. It is titled Timed-Transfer System Planning, Design and Operation (Philadelphia: 1981).

2 U.S. Department of Transportation, Urban Mass Transportation Administration, Planning and Designing a Transit Center Based Transit System, Guidelines and Examples From Case Studies in 22 Cities (Washington, D.C.: 1980), pp.6-10.

3 Public Technology, Inc., The Urban Transportation Planning System, An Introduction for Management (Washington D.C.: June 1980), pp. 1-2.

Table 1

FACTORS TO CONSIDER WHEN LOCATING

INTERCEPT FACILITIES

Space availability; ease of land acquisition	Compatibility with surrounding land uses and local comprehensive plans
Access to activity centers (pedestrian access to CBD should be within 2-3 blocks)	Bus re-routing required
Pedestrian, automobile, bus, and bicycle access to the facility	Effect on pedestrian circulation and safety
Usefulness of location as a focal point, either for the city or the transit system; visibility	Effect on traffic circulation and safety
Number of vehicles that need to be accommodated, and adequate space and layout for their movement	Environmental impact
Potential for expansion or joint development	Economic impact
Proximity to existing trip origins and destinations	Access to street system and freeways
Population and employment in the area	Multimodal interface potential
	Passenger demand
	Potential for easy transferring between lines

Source: Public Technology, Inc. (List adapted from a number of different publications and sources.)

- o UTPS Computer Package, which is a significantly more complicated and detailed set of transit planning tools. Portland, Oregon's Tri-County Metropolitan Transportation District (Tri-Met) used the UTPS Computer Package to evaluate short-range transit system alternatives as the basis for its five year plan.

Another tool is available that assists in the planning of a timed-transfer system (see below). It is called the Transit Network Optimization Program (TNOP).[4] TNOP is an interactive graphic program that enables the planner to test different size and location concepts for transit centers and devise timed-transfer route/schedule plans quickly and efficiently. It is currently being used by Seattle Metro.

Also, the National Cooperative Highway Research Program (NCHRP) has sponsored the development of a user's manual compiling planning techniques for estimating each element of travel demand including trip distribution, trip generation, traffic assignments, and land use considerations.[5]

Designing Intercept Facilities

Since anything from a park-and-ride or park-and-pool lot to a bus stop to a major multimodal transit center may be considered an intercept facility, design considerations will range widely.[6] Many of the factors important in locating a facility are similarly important in developing its design. A fundamental objective in the design of an intercept facility is that it should be capable of processing large numbers of vehicles and people quickly and efficiently with minimal trip disruption.

For a large regional intercept facility, the design considerations may be numerous and complex. While most local government agencies will hire architectural and engineering consultants to perform the alternatives analysis and develop a design for large projects, planners still need a framework to deal with site-specific design issues and to help them identify and evaluate the design options. Such design considerations may include:

- o Points of view and needs of users. Who are the people who will be using the facility and what are their destinations?

- o Efficiency of movement. Determining the best way to move people

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4 M.H. Rapp and C.D. Gehner, "Transfer Optimization in an Interactive Graphic System for Transit Planning", Transportation Research Record, No. 619 (Washington, D.C.: 1976), pp. 27-33.

5 NCHRP Report 187, Quick Response Urban Travel Estimation Techniques and Transferable Parameters - User's Guide (Transportation Research Board Washington, D.C.: n.d.).

6 For a good listing of intercept parking programs, see Public Technology, Inc.'s 1981 companion Information Bulletin, The Coordination of Parking With Public Transportation and Ridesharing.

and vehicles efficiently through an intercept facility will require an analysis of:

-- The number of passengers estimated to pass through the facility daily.
-- The number of vehicles estimated to use the facility daily.
-- The number of riders estimated to be waiting for a transit vehicle at the site during its busiest hour.
-- The number of transit vehicles requiring berths at the facility at once during its peak use period.
-- The scale of the activity center at which the facility is to be located.
-- The number of buses requiring layover space during the peak period.[7]

- Physical environment. The physical environment of the facility will affect passengers' sense of security, their understanding of how to transfer, and their willingness to use the facility.

- Economy of operation. This requires using low maintenance materials, planning for total facility costs at the outset, and designing to take advantage of other sources of revenue, through joint development or by providing easy access between the facility and a nearby activity center.[8]

- Flexibility. Flexibility of design allows for future expansion of the facility and for changing passenger processing elements when necessary.[9]

Material in Appendix A provides a fairly comprehensive list of design considerations and shows how one agency, the Orange County Transit District, evaluates alternative facility locations and designs.

Transferring

The use of intercept facilites to join suburban, regional, and downtown travel will require transfers between any pair of the following travel modes:[10]

- Bus (whether standard size or smaller).

- Rail (light or heavy).

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7 U.S. DOT, Planning and Designing, p. 34.

8 Ibid.

9 Lester A. Hoel, et. al., Criteria For Evaluating Alternative Transit Station Designs (Washington, D.C.: 1976), pp. iv-14.

10 For more information on the coordination of transit with other transportation modes, see Coordination of Paratransit with Conventional Transit, Public Technology, Inc., (Washington, D.C.: 1980).

- o Downtown people mover.
- o Automobile.
- o Foot.

Most transit users, however, feel that transferring will make their trips less convenient, reliable, and safe, or more expensive or confusing. To reduce these anxieties, the following factors must be addressed in planning the facility:

- o Distance. The farther the passenger has to walk to transfer, the less convenient, safe, and reliable his trip will seem.
- o Wait time. The longer the passenger has to wait to transfer, the less convenient, safe, and reliable his trip will seem. Wait time can be minimized either by coordinating the schedule of routes using the facility or by providing such frequent service that formal coordination is not necessary. Frequent, shuttle-type service is more appropriate in areas where the volume of travel is large. Denver will employ specially-designed shuttle vehicles on its downtown transit mall at such frequent intervals that travelers coming into the intercept terminals at either end of the mall will have virtually no wait to get on the shuttle to their downtown destinations. However, at Denver's 13 intercept facilities around the region, timed-transferring or pulse scheduling (see below) will be used.

  Coordinated scheduling options include:[11]

  -- Schedule coordination: Simple schedule adjustments that do not disturb the rest of the schedule but may reduce the amount of wait time between transfers.
  -- Dynamic control of departure times at transfer points: holding a transit vehicle at a transfer point until the originating bus arrives. This is generally not used in large transit systems, because it is difficult to make up the time spent waiting on longer and more complex routes.
  -- Timed-transfers: provides for vehicles on different routes to meet at regular intervals. There are four kinds of timed-transfers: simple, where vehicles on two routes are scheduled and guaranteed to meet at a transfer point; pulsed, where vehicles on all or most routes meeting at a major transfer point, usually near the CBD, wait for all vehicles to arrive and then leave together, pulsing at an average frequency of every 30 minutes; line-ups, which are similar to pulsed timed-transferring except that the frequency of the pulse is longer (usually one hour), and layover times are longer; and neighborhood pulse, where schedules of neighborhood routes are coordinated

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[11] U.S. DOT, Office of Service and Methods Demonstrations, Transit Operator Guidelines for Transfer Policy Design (Boston: June 1980), pp. 23-28.

for circulation within a subsection of a city. Designing a timed-transfer system is a very difficult task that cannot, in most cases, be performed very satisfactorily with manual, intuitive methods. Those who have had experience with timedtransfer systems suggest that agencies cannot hope to design such systems without the aid of a planning tool like TNOP (described above).

- Cost. The degree to which the overall cost of a trip is increased by a transfer charge will also affect passengers' willingness to use a system where transferring is required. Reasons for instituting a transfer charge include reducing transfer abuse, accounting for political or equity imbalances, or raising additional revenue. Agencies may want to eliminate transfer charges, on the other hand, as part of a promotional scheme or for increasing operating efficiency.

- Understanding the system. Transit riders may simply not understand how the system works. Informational devices--printed schedules, posted schedules, telephone information systems, schedules with information on the best connections and on transfer policies and costs--that are readily available and easy to use can improve system understandability. The Regional Transit Association of the San Francisco Bay Area is attempting to make using the vast number of Bay Area routes and transferring between the six systems providing service on them less confusing by publicizing regional trunklines and transfer points, providing easily understandable and obtainable integrated route and schedule information, and encouraging opportunities for non-peak and weekend transit use through destination-based promotions. No significant intersystem routing or scheduling coordination is planned, however.

  Another way to improve user understanding is to take a marketing approach that emphasizes the convenience and service advantages of the transfer system. In some cities, the transfer slip itself is redeemable at a local store or gives the holder an extra transit ride or some other benefit.[12]

Appendix B summarizes the relative effects of transfer policy components on five factors: operator effort, cost, user satisfaction, ridership, and revenue.

THE DOWNTOWN CIRCULATION SYSTEM

The downtown circulation system provides mobility within the downtown as distinct from trips to and from downtown. In general, internal

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[12] A Pennsylvania Department of Transportation study entitled Transit Marketing in Pennsylvania, A Handbook of Effective Transit Marketing Aids (Washington, D.C.: 1981) provides very useful guidance with broad applicability on various marketing and promotional techniques.

circulation trips are shorter, less vehicle oriented, and not concentrated during the peak commuter hours.[13]

Developing a downtown circulation system suited to downtown travel needs will require examining the following:

- o City and transit agency long range goals for downtown circulation.
- o Distribution of downtown activity and land uses and their projected growth rates.
- o Travel pattern analysis of pedestrian and vehicular trip densities, times, purposes, and lengths.
- o Traffic system analysis including street uses, major traffic problems, number of downtown access roads, and parking availability and use.
- o Site-specific considerations such as topography and climate.[14]

Downtown ciruclation systems may be classified as pedestrian, vehicular, or, as in most cities, a combination of both.

Pedestrian Circulation Systems

A circulation system that is primarily pedestrian has various advantages. It requires no fuel, produces no pollution, involves no wait, contributes little or not at all to traffic congestion, and is the least expensive.

Deciding to make walking the primary mode of internal circulation means restricting alternative modes and examining the following:

- o Distance. The average distance people are willing to walk is 1/4 of a mile.[15]
- o Street grades. Street grades exceeding 10% appreciably reduce the appeal of walking even short distances.
- o Exposure to the elements. If the climate in an area is severe several months of the year, covered walkways, whether at-grade, elevated, or underground, may be advisable.
- o Pedestrian safety. Adequate pedestrian traffic safety and security measures need to be taken.

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13 City of Seattle, Office of Policy Planning, Downtown Seattle Internal Circulation (Seattle: 1979), pp. 2-15.

14 Ibid., p. 43.

15 U.S. DOT, Planning of Designing, p. 35.

- Perceptions of walking. Cities have catered to the automobile at the expense of the pedestrian for so long that many cities lack amenities such as wide sidewalks, trees, benches, and concession booths that make walking appealing. The proliferation of pedestrian and transit malls is evidence that this trend is being reversed in many cities.[16]

Vehicular Circulation Systems

There are specific issues related to designing a vehicular system, not the least of which is deciding what type of vehicles to use. Cities have used or will be using standard sized transit coaches (Toledo); smaller coaches (Washington, D.C.); special shuttle vehicles, either diesel- or electrically-powered (Denver); light rail (Buffalo); heavy rail (Washington, D.C.); or soon, downtown people mover (Miami). In some of these cases the downtown circulation system is simply an extension of the regional system rather than a separate entity that only interfaces with the regional system at the intercept facilities.

The City of Seattle surveyed the most important issues related to developing vehicular circulation systems as part of planning for its own system. The list of planning considerations in Appendix C is adapted from Seattle's work.

MANAGING THE AUTOMOBILE IN THE DOWNTOWN

The third part of an intercept strategy includes measures that reinforce the intercept network and reduce the attractiveness of one-person auto trips coming into the downtown.[17] Improved public transportation access to and circulation within the downtown are not enough to reduce downtown automobile congestion if the ease and attractiveness of private automobile use remain relatively unchanged.

Many cities use TSM or automobile management measures alone, without parallel actions to improve the transportation network, as tactics to achieve the same results as a comprehensive strategy. Some officials have found that implementing one or two actions can have significant positive impacts on downtown circulation. By themselves, or in various combinations, they may be less capital-intensive and expensive and easier to implement physically, if not institutionally or politically, than the comprehensive strategy. For example, traffic engineering improvements alone can have a significant impact on improving the attractiveness of public

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16 City of Seattle, Downtown Seattle Internal Circulation, pp. 24-27.

17 Ridesharing, whether used to go all the way to downtown destinations or to feed intercept facilities, should be considered an integral part of the intercept strategy because it reinforces the concept of consolidating regional travelers by destination outside the downtown, thereby eliminating unnecessary vehicular traffic before it reaches downtown.

transit, reducing the appeal of driving alone, and generally inhibiting the unrestrained growth of congestion and its negative effects. Since there are over 200,000 signalized intersections in urban areas in the United States, optimizing traffic signal timing or providing priority signal treatment for buses at intersections can reduce vehicle stops, delay, fuel consumption, and exhaust pollution, for example. The same is true of other traffic engineering improvements, such as left turn and right turn lanes at intersections, reversible flow lanes, intersection design that favors bus operations, one-way street operations, and others.

Many of these measures and their effects are described in an Urban Consortium Information Bulletin, Transportation System Management, Air Quality, and Energy Conservation[18] and elsewhere.[19] Such measures may be classified as either economic tactics--those affecting the relative cost of using the automobile or the intercept facility and internal circulation system--and physical tactics--those affecting the relative ease of using the automobile or using the intercept facility and internal circulation system. Table 2 lists possible tactics.

One of the more innovative but less well-known tactics noted above deserves special mention for its effectiveness. Not yet attempted in its pure form in the United States,[20] the traffic cell or zone and collar scheme has been used in Gothenburg, Sweden, Nagoya, Japan, and elsewhere. City center or residential areas bound by main roads are divided into cells or sections by physical barriers. To get from one cell to another, automobile drivers must use a ring road, while pedestrians, bicyclists, and, in some cases, transit vehicles, may cross boundaries freely on specially designated routes. Heavy traffic is diverted to the periphery, and urban automobile travelers are forced to consider some alternate mode of transportation. Very often, some of the tactics listed in Table 2 are used to complement and reinforce the traffic cell. Although politically difficult to implement, traffic cells have been effective in reducing the number of auto accidents, the costs of operating public transportation, noise and air pollution levels, and the number of cars entering the central

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18 Public Technology, Inc., Transportation System Management, Air Quality, and Energy Conservation (Washington, D.C.: 1980).

19 See also: Federal Highway Administration, Traffic Control System Improvements: Impacts and Costs, FHWA-PL-80-005 (Washington, D.C.: 1980); Charles W. Dale, Procedure for Estimating Highway User Costs, Fuel Consumption, and Air Pollution, prepared for the Federal Highway Administration (Washington, D.C: 1980); Federal Highway Administration, A Plan for Energy Conservation Through Improved Traffic Operations Measures, Office of Traffic Operations (Washington, D.C.: 1979); Federal Highway Administration, National Highway Institute, Alternatives for Improving Urban Transportation--A Management Overview, Student Notebook (Washington, D.C.: n.d).

20 The Downtown Crossing in Boston, an auto restricted zone, is a limited version of the traffic cell.

Table 2

AUTO MANAGEMENT MEASURES TO COMPLEMENT
THE INTERCEPT STRATEGY

Economic Tactics:

- Increased parking rates
- Parking taxes or surcharges, as during peak period travel
- Ticketing, booting, towing: the role of fines[21]
- Pricing incentives for high occupancy vehicles
- Reduced transit fares for off-peak riders
- Fare-free zones or other internal circulation system pricing incentives
- Area licensing: cordoning off part or all of a city center and allowing only those drivers with a supplementary license to have access to the area[22]

Physical tactics:

- Reducing or freezing parking supply, through zoning ordinances, parking freezes, or the elimination of on-street parking
- Favoring parking by short term users over all day commuters
- Residential parking permit programs
- One-way streets
- Traffic channelization
- Priority treatment--parking, exclusive lanes, special turning privileges, traffic signal privileges, traffic signal preemption, transit malls--for transit and high occupancy vehicles
- Traffic cells and zone and collar schemes[23]

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[21] Public Technology, Inc., Information Bulletin, Parking and Traffic Enforcement (Washington, D.C.: 1980).

[22] National League of Cities, Transportation and the Urban Environment (Washington, D.C.: 1980), p. 30.

[23] Ibid., and Public Technology, Inc., Center City Environment and Transportation: Transportation Innovations in Five European Cities (Washington, D.C.: 1980), pp. 35-41.

city. They also are improving the regularity of transit services and running times, increasing the use of public transportation to enter the center city, and diverting traffic to the outer ring road.[24]

MAKING THE INTERCEPT STRATEGY WORK

In addition to the issues associated with any of the three parts of an intercept strategy, there are broader issues involved in any comprehensive plan to restrict automobile and transit access into the city center.

Financing

An intercept strategy in its most comprehensive form is expensive to plan and implement. Experience suggests that intercept facilities can easily cost $1 million or more. Restructuring transit routing and scheduling and designing a new internal circulation system are time-consuming, costly endeavors. The financing picture becomes more bleak as traditional sources of funds from local, State, and Federal budgets are drying up.

Still, cities are finding ways to assemble financing packages, and non-traditional sources of funding are being pursued aggressively. In Lowell, Massachusetts, a comprehensive program of major downtown transportation improvements is being funded jointly by a wide variety of Federal agencies. Miami's downtown people mover project has suffered a funding shortage but anticipates floating a municipal bond issue and bringing in more private developers and contributors to make up the difference. The City of Baltimore has been given a $1 million grant from UMTA that, along with $.05 million from a local bond issue, will finance the design of its downtown Howard Street Mall.

In terms of project financing, there are three issues.[25]

- Who pays? Primary Federal funding sources have been the Urban Mass Transportation Administration, Urban Mass Transportation Act of 1964, as amended: Section 8 funds for planning, Section 6 funds for demonstrations, Section 3 funds for capital expenditures, Section 4(i) funds for innovative transportation projects; the Federal Highway Administration: Interstate Transfer funds or Federal and Urban System (FAUS) funds; the Department of Housing and Urban

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[24] Public Technology, Inc., Transportation System Management, Air Quality, and Energy Conservation (Washington, D.C.: 1980), p. 15.

[25] U.S. Department of Transportation, Office of Service and Methods Demonstrations, Streets for Pedestrians and Transit: An Evaluation of Three Transit Malls in the United States (Washington, D.C.: 1979), p. 11.

Development: Community Development Block Grants, Urban Development Action Grants. Other sources have been local taxes, bond issues, special assessments on nearby property owners, and private funding sources, such as contributions from shopping center developers and joint development. A new Urban Consortium Information Bulletin entitled Inflation Responsive Transit Financing describes some recent and creative sources of financing for transit projects.[26]

- How much does an intercept project cost to build and operate? This will depend entirely on the extent of preliminary planning, design, and engineering work needed, and on the scope and complexity of the project.

- How much does it cost to maintain and operate, and who is responsible for this operation? The cost of maintenance and operations will depend on pedestrian volumes, labor costs, energy costs, and the quality of materials used. The responsibility will usually be shared by the city or county, property owners, and the local transit authority.

Phased Implementation

Studies of transit malls and other major downtown transit and traffic projects suggest that implementing such projects in stages is advisable for two reasons:

- People can gradually become familiar with what may eventually be dramatic changes in the way they get into the downtown, and this can help reduce the initial resistance to change.

- The sponsoring agency can observe how the changes are being received by the public and make adjustments accordingly, before too large a capital commitment has been made, and the project becomes irreversible.

Impact of Construction

Some of the strongest resistance to implementing a program to intercept traffic, especially where intercept facilites and transit malls are being used, may develop in connection with the construction phase. Merchants fear that the disruption will repel downtown shoppers, and other downtown interests dislike the inconvenience, unsightliness, and noise. Cities have mitigated the effects of construction activity by keeping the community informed in monthly updates and newsletters of what to expect in the coming months; stipulating that major construction work be done at night; and using construction activity as a promotional tool, as Pittsburgh

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26 Public Technology, Inc., Inflation Responsive Transit Financing (Washington, D.C.: 1981).

is doing with the construction of its light rail system (see Chapter 3, Contacts and Current Programs). Carefully phasing construction activity is an important element in minimizing the negative impacts of construction. Portland accomplished this during the construction of its mall. While utility work and street repaving were being completed, pedestrians used the old sidewalks. Temporary sidewalks with bridges connecting them to store entrances were constructed while the curbs and sidewalks were being redone. At intersections on the mall, cross traffic was narrowed to one lane on no more than four intersections at one time. Even though general traffic was banned on the two mall streets during the entire construction period, construction was scheduled so that regular bus service could continue operating on the streets. Even though pedestrian counts in the immediate construction area during this time showed a drop in pedestrian activity, pedestrian activity on adjacent streets showed a dramatic increase, resulting in a net increase in the number of pedestrians counted on all downtown Portland streets.[27]

Institutional Coordination

One of the most significant elements of success in a comprehensive downtown traffic intercept project is the extent of cooperation and coordination that can be established among the various agencies whose authority must be tapped to plan, implement, and operate such projects. While one group--most likely the business community or the city planning department--may spearhead an idea, other groups must be brought into the process early on for smoothing resistance, establishing cooperation and coordination, and joint planning under the Federally mandated A-95 process for coordinating grant applications.

Very often, however, establishing a collaboration will call upon agencies and groups to be cooperative where they have historically been at odds with each other over goals, funding, authority, and bureaucratic procedures. Effective coordination is best achieved when a third-party group represented by all the component groups--Federal, State, regional, and local government bodies along with private developers, merchants, CBD businessmen, and citizens at large--is formed and actively involved in every aspect of planning and implementation.

Obtaining Retail and Business Community Support

Another significant obstacle to the successful implementation of major downtown transportation projects may be obtaining support of the retail and business community. Some of the larger, more successful projects were, however, inspired by business community support. While some downtown businessmen may view such projects as necessary for downtown revitalization and retail and economic health, many fear that any restriction of access or parking may result in a loss of sales and a general

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[27] U.S. DOT, Streets for Pedestrians and Transit: An Evaluation of Three Transit Malls in the United States, pp.181-183.

economic decline. Hard data are scarce, but available evidence suggests that malls in Portland, Oregon, and Minneapolis and the Downtown Crossing in Boston have had positive effects on the retail and economic environment in the downtown. Evaluations of the Downtown Crossing have revealed a 27% increase in the total volume of sales for all stores.[28] Other findings about the Downtown Crossing and other mall projects include:

- Evidence of an increase in retail sales or of stabilized sales that were previously declining.
- Increased store turnover rates, with national chains and stores geared to young middle class customers moving in.
- Lower vacancy rates and stabilized rental rates.
- Increased public and private investment.
- Evidence that transit malls and other new downtown developments develop a mutually supportive relationship.
- Evidence of a new cooperative spirit between business and government.[29]

These findings may not apply to mall projects in smaller cities with populations between 50,000 and 100,000.

Another source of business and retail community concern about these projects is the effects they will have on urban goods movement. Many cities with restricted areas do not allow goods delivery within them. In these cases, special arrangements must be made for goods delivery.

Special attention should be given at the outset to organizing the business and retail community to overcome competition and to provide support. Boston's Downtown Crossing Association is an excellent example of such coordination. This private, non-profit association of downtown merchants and business establishments coordinates activities, arranges seasonal and special events, promotes the Downtown Crossing, and acts as a liaison between the public and private sectors on such issues as redevelopment activities, traffic and sign control, street improvements, maintenance, security, zoning, licensing, and sanitation.

Another way to obtain business and retail community support is to have at least one prominent business person actively associated with the proj-

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28 Cambridge Systematics, Inc. "Business and Travel Impacts of Boston's Downtown Crossing Auto-Restricted Zone" (Draft Report; Cambridge: January 1982), p. 21.

29 U.S. Conference of Mayors, Auto in the City: An Examination of the Techniques Mayors Can Use to Reduce Traffic in Downtown Areas (U.S. DOT: Washington, D.C.: October 1979), p. 12.

ect. This leadership from within the business community is commonly found in the successful projects.

Promotion

Proper promotion can generate broad community support. If the public has been prepared for the changes that are coming, it is possible it will be more excited about them than resistant to them. The elements of the most effective public relations programs are:

- Starting early.
- Giving the project maximum visibility.
- Providing public accessibility with on-site offices and full time staff.
- Capitalizing on potentially unpopular situations during planning or implementation by turning them into promotional events.

Impacts on the Community

Although the effect of an intercept strategy may be regional in scope, the major focus of activity and capital improvements involved in implementing such a strategy may appear to be taking place only in the downtown. Elected officials and their constituents in the suburbs may be reluctant to support a project perceived to benefit only the center city, although many of them probably work in the downtown. On the other hand, city residents may feel such projects benefit the white collar commuter at the expense of economically disadvantaged residents of central city neighborhoods.

In addition, central city neighborhoods or neighborhoods adjacent to construction sites or facilities may be concerned about environmental degradation as a result of increased development pressure, traffic, and parking on their neighborhood streets. In Santa Clara County, California, a shopping center withdrew its offer to contribute 75% of the cost of constructing a transit center when local residents complained about the increased noise and activity the center would create.[30]

Impact of Diverted Traffic

Not even the most comprehensive, best-planned strategy for intercepting traffic will reduce the volume of traffic coming into the downtown to the desired level. Persistent drivers, diverted from some newly closed streets or discouraged from parking downtown by the cost or lack of parking, may use other streets, thereby displacing rather than reducing congestion.

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30 For more information, see Public Technology, Inc.'s 1981 companion Information Bulletin, The Impact of Traffic on Residential Areas (Washington, D.C.: 1981).

A detailed traffic circulation and parking plan should be an integral part of an internal circulation system. Experience with traffic diversion, however, indicates that much displaced traffic simply disappears, either because drivers find other places to park or because some of the original circulation is no longer necessary. It is especially important to complement the intercept with other measures, such as a residential parking permit program and traffic flow improvements, to reduce congestion rather than just move it to a different location. In Boston, the traffic limitations on certain streets diverted through traffic to alternate routes without any increase in traffic congestion. This has been primarily due to the elimination of on-street parking on the new routes and strict enforcement of traffic regulations to maintain traffic flow.

Impacts on Land Use

The impacts on land use of an intercept strategy where major new development and transportation improvements are involved may include:

- Pressure for new development in the area.
- Increase in property values.
- Increase in the proportion of the area used for office space.
- Increased interest in inner-city and near downtown housing.[31]

These impacts may be viewed as either the positive results of a project inspired by the need to revitalize the center city or the negative ramifications of a project that will fundamentally alter inner-city neighborhoods and displace their residents.

Involving local communities in land use decisions is critical. Dade County, in the process of planning its heavy rail transit system, paid certain communities to identify how rapid transit stations might affect the revitalization or conservation of neighborhoods, to recommend alternatives for development, and to work with developers and the County to bring in development that was compatible with the various station areas and complemented the adjacent neighborhoods as well as the transit stations.[32]

Impacts on Transit

Although transit ties together the various parts of a traffic intercept strategy, improving transit operations and increasing ridership have not been the primary objectives of these projects in the past. However,

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[31] U.S. DOT, Streets for Pedestrians and Transit: An Evaluation of Three Transit Malls in the United States, p. 135.

[32] Ronald J. Hartman and John M. Zakotnik, "Land Use and Transportation Decisions: A Survey of Local Coordination", Transit Journal, Vol. 6, No. 4 (American Public Transit Association, Washington, D.C.: Fall 1980), pp. 40-41.

because reducing downtown congestion is the primary objective, transit has indirectly stood to gain by being a prime transportation alternative.

The intercept strategy may affect transit operations in the following ways:

- Travel time. In theory, less congestion will result in faster travel times. However, in reality that time savings may be negated by other factors, such as increased loading and unloading time and transfer time. In Philadelphia and Minneapolis, bus travel times along the malls did not decrease noticeably, although service reliability did improve. In Portland, however, travel times along the mall were reported to have decreased by 50%, although this is attributed to an unusually severe congestion problem before the mall was built and to new traffic signal timing. [33]

- Reliability. A traffic intercept strategy may have a significant positive impact on transit reliability, especially in outlying areas where coordinated transferring (see above) may be used at suburban intercepts. Controlled circulation in the downtown also prevents some of the major delays due to congestion and auto accidents that cause some transit systems' worst reliability problems.

- Passenger convenience. Many transit patrons are likely to view anything that restricts their automobile use and requires them to transfer as less convenient. Experience indicates, however, that if the system works well and is reliable, people eventually adapt their travel behavior. In addition, if the intercept strategy allows a higher level of transit service in other parts of the region, then passenger convenience may well be improved.

- Productivity, or passenger volumes. Thus far, there is little evidence indicating that the implementation of intercept facilities with coordinated transit and traffic changes has a great effect on transit productivity or ridership. In the downtown, limited experience suggests that the volume of short trips increases significantly, although evaluations of existing transit malls have not been able to link this increase conclusively with the presence of the mall or the institution of transit and traffic changes. In outlying areas, while ridership may increase in both commuter and intra-suburban travel markets, as it has in Portland's westside timed-transfer area, the increased costs of the improved level of service around the intercept facility or transit center may offset the increase in transit use.

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33 U.S. Conference of Mayors, Auto in the City, pp. 11-12.

Chapter 3

CONTACTS AND CURRENT PROGRAMS

CONTACTS

Below is a list of the important contacts and programs within the Federal government and at the local level. While the list may not be complete because the number of programs and methods to intercept downtown-bound traffic is so large, it represents a good starting point for obtaining additional information.

U.S. DEPARTMENT OF TRANSPORTATION

Office of the Secretary

- Office of Technology Sharing
  Provides a variety of technical and general information to State and local governments.
  Contact: Al Linhares
  Director, Office of Technology and Planning Assistance (I-30)
  400 Seventh Street, S.W.
  Washington, D.C. 20590
  (202) 426-4208

Federal Highway Administration

- Office of Highway Planning, Transportation Management and Ridesharing Programs Branch
  Supports TSM strategy development, planning and implementation.
  Contact: Transportation Management and Ridesharing Programs Branch (HHP-25)
  Office of Highway Planning
  400 Seventh Street, S.W.
  Washington, D.C. 20590
  (202) 426-0210

- Office of Engineering
  Provides information and technical assistance on design of highway

related transit facilities and administers the Federal-aid highway program.

Contact: John Hibbs, Chief
Highway Design Division (HNG-20)
400 Seventh Street, S.W.
Washington, D.C. 20590
(202) 426-0317

- Office of Traffic Operations
  Provides information and technical assistance on traffic regulations and traffic control methods, including signalization.
  Contact: Traffic Control Systems
  Division (HTO-20)
  400 Seventh Street, S.W.
  Washington, D.C. 20590
  (202) 426-0411

Urban Mass Transportation Administration

- Office of Planning Methods and Analysis
  Develops, disseminates, and maintains manual and computer analysis tools for transportation planning.
  Contact: Samuel Zimmerman
  Director, Office of Methods and Analysis (URT-40)
  400 Seventh Street, S.W.
  Washington, D.C. 20590
  (202) 452-9271

- Office of Grants Management
  Provides planning guidance on various transportation projects and their impacts on cities.
  Contact: Richard Steinmann
  Planning and Resource Management (UGM-21)
  400 Seventh Street, S.W.
  Washington, D.C. 20590
  (202) 472-5140

- Office of Service and Management Demonstrations
  Sponsors a wide variety of transit and paratransit demonstrations and research on the effects of transferring and fare policies and on ways to improve transit reliability. Has done much work on transit and pedestrian malls and other forms of automobile restriction. This office also sponsors a number of projects directed at increasing transit productivity and performance.

Contact: James Bautz
Chief, Transit Services Division, URT-31
400 Seventh Street, S.W.
Washington, D.C. 20590
(202) 426-4984

- Transit Assistance
  Administers Capital Grant Programs.
  Contact: Brian Cudahy
  Director, Office of Formula and Capital Programs (UGM-10)
  400 Seventh Street, S.W.
  Washington, D.C. 20590
  (202) 472-2440

For more information, contact one of the UMTA Regional offices, listed in Table 1.

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

- Office of Block Grant Assistance
  Administers the Community Development Action Grant Program.
  Contact: David Pollack
  Branch Chief, Entitlement City Divisions
  451 Seventh Street, S.W.
  Washington, D.C. 20590
  (202) 755-6306

- Urban Development Action Grant Program
  Contact: Michael McMahon
  Division Director, Urban Development Action Grant Program
  451 Seventh Street, S.W.
  Washington, D.C. 20590
  (202) 755-6234

  See also the HUD Area Offices, listed in Table 3.

ENVIRONMENTAL PROTECTION AGENCY

- Office of Transportation and Land Use Policy
  Provides technical and policy guidance on Clean Air Act Requirements for including transportation-related control measures in State Air Quality Implementation Plans.
  Contact: John Hindinger
  Director
  Office of Transportation and Land Use Policy (ANR-445)
  401 M Street, S.W.
  Washington, D.C. 20590
  (202) 775-0480

Table 1

UMTA REGIONAL OFFICES

Region I	Richard Doyle, Regional Director, Transportation Systems Center, Kendall Square, 55 Broadway, Suite 904 Cambridge MA 02142, Tel: (617) 494-2055; FTS 837-2055.
Region II	Alfred A. DelliBovi, Regional Director, Suite 14-130, 26 Federal Plaza, New York, NY. Tel: (212) 264-8162.
Region III	Peter N. Stowell, Regional Director, Suite 1010, 434 Walnut Street, Philadelphia, PA 19106 Tel: (215) 597-8098; FTS 597-8098.
Region IV	Carl B. Richardson, Regional Director, Suite 400, 1720 Peachtree Road, N.W., Atlanta, GA 30309. Tel: (404) 881-3948
Region V	Joel Ettinger, Regional Director, 300 South Wacker Drive, Suite 1740, Chicago, IL 60606, Tel: (312) 353-2789; FTS 353-2789.
Region VI	Glen Ford, Regional Director, Suite 9A32, 819 Taylor Street, Fort Worth, TX 76012, Tel: (817) 334-3787; FTS 334-3787.
Region VII	Lee Waddleton, Regional Director, Suite 100, 6301 Rock Hill Road, Kansas City, MO 64131 Tel: (816) 926-5053; FTS 926-5053.
Region VIII	Lou Mraz, Regional Director, Suite 1822, Prudential Plaza, 1050 17th Street, Denver, CO 80265 Tel: (303) 837-3242; FTS 327-3242.
Regional IX	Dee Jacobs, Regional Director, Suite 620 Two Embarcadero Center, San Francisco, CA 94111 Tel: (415) 556-2884; FTS 556-2884.
Regional X	Aubrey Davis, Regional Director, Suite 3142 Federal Building, 915 Second Avenue, Seattle, WA 98174, Tel: (206) 442-4210.

Table 2

HUD AREA OFFICES

The U.S. Department of Housing and Urban Development area offices are provided here as contacts for additional information on sources of funding and technical assistance for planning and designing downtown facilities such as transit centers, malls, pedestrian areas, and other development activities.

Region 1

Boston Area Office
Bulfinch Building, 15 New Chardon Street
Boston, Massachusetts 02114
(617) 223-4111

Hartford Area Office
One Hartford Square West, Suite 204
Hartford, Connecticut 06106
(203) 244-3638

Region II

Buffalo Area Office
Statler Building, Mezzanine
107 Delaware Avenue
Buffalo, New York 14202
(716) 826-5755

Caribbean Area Office
Federico Degetau Federal Building
U.S. Courthouse, Room 428
Carlos E. Chardon Avenue
Hato Rey, Puerto Rico 00918
(809) 753-4201

New York Area Office
26 Federal Plaza
New York, New York 10278
(212) 264-0644

Newark Area Office
Gateway Building No. 1, Raymond Plaza
Newark, New Jersey 07102
(201) 645-3010

Region III

Baltimore Area Office
Mercantile Bank and Trust Building
2 Hopkins Plaza
Baltimore, Maryland 21201
(301) 962-2121

Philadelphia Area Office
625 Walnut Street
Philadelphia, Pennsylvania 19106
(215) 597-2645

Pittsburgh Area Office
Fort Pitt Commons
445 Fort Pitt Boulevard
Pittsburgh, Pennsylvania 15219
(412) 644-2802

Richmond Area Office
701 E. Franklin Street
Richmond, Virginia 23219
(804) 771-2721

Washington D.C. Area Office
Universal North Building
1875 Connecticut Avenue, N.W.
Washington, D.C. 20009
(202) 673-5837

Region IV

Atlanta Area Office
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303
(404) 221-4577

Birmingham Area Office
Daniel Building, 15 S. 20th Street
Birmingham, Alabama 35233
(205) 254-1617

Columbia Area Office
Strom Thurmond Federal Building
1835-45 Assembly Street
Columbia, South Carolina 29201
(803) 765-5591

Greensboro Area Office
415 North Edgeworth Street
Greensboro, North Carolina 27401
(919) 378-5363

Jackson Area Office
U.S. Federal Building
100 W. Capital Street, Room 1016
Jackson, Mississippi 39201
(601) 960-4702

Jacksonville Area Office
Peninsular Plaza, 661 Riverside Avenue
Jacksonville, Florida 32204
(904) 791-2626

Knoxville Area Office
1 Northshore Building, 1111 Northshore Drive
Knoxville, Tennessee 37919
(615) 558-1384

Louisville Area Office
539 River City Mall
P.O. Box 1044
Louisville, Kentucky 40202
(502) 582-5251

Region V

Chicago Area Office
One North Dearborn
Chicago, Illinois 60602
(312) 353-7660

Columbus Area Office
200 N. High Street
Columbus, Ohio 43215
(614) 469-7345

Detroit Area Office
McNamara Federal Building
477 Michigan Avenue
Detroit, Michigan 48226
(313) 226-7900

Indianapolis Area Office
151 North Delaware Street
P.O. Box 7047
Indianapolis, Indiana 46207
(317) 269-6303

Milwaukee Area Office
744 North Fourth Street
Milwaukee, Wisconsin 53203
(414) 291-1493

Minneapolis St. Paul Area Office
220 Second Street, Bridge Place Building
Minneapolis, Minnesota 55401
(612) 349-3000

Region VI

Dallas Area Office
2001 Bryan Tower, 4th Floor
Dallas, Texas 75201
(214) 767-8288

Little Rock Area Office
One Union National Plaza, Suite 1400
Little Rock, Arkansas 72201
(501) 378-5401

New Orleans Area Office
1001 Howard, Plaza Tower
New Orleans, Louisiana 70113
(504) 589-2063

Oklahoma City Area Office
Murrah Federal Building
200 N.W. 5th Street
Oklahoma City, Oklahoma 73102
(405) 231-4891

San Antonio Area Office
800 Dolorosa, P.O. Box 9163
Washington Square Building
San Antonio, Texas 78285
(512) 229-6781

Region VII

Kansas City Area Office
Professional Building, 1103 Grand Street
Kansas City, Missouri 64106
(816) 374-4355

Omaha Area Office
Univac Building, 7100 West Center Road
Omaha, Nebraska 68106
(402) 221-9301

St. Louis Area Office
210 North Tucker Boulevard
St. Louis, Missouri 63101
(314) 425-4761

Region VIII

Denver Regional/Area Office
Executive Tower Bldg., 1405 Curtis Street
Denver, Colorado 80202
(303) 837-4513

Region IX

San Francisco Area Office
One Embarcadero Center, Suite 1600
San Francisco, California 94111
(415) 556-2238

Honolulu Area Office
300 Ala Moana Blvd., Room 3318
Honolulu, Hawaii 96850
(808) 546-2136

Los Angeles Area Office
2500 Wilshire Blvd.
Los Angeles, California 90057
(213) 688-5974

Region X

Anchorage Area Office
334 West Fifth Avenue
Anchorage, Alaska 99501
(907) 271-4170

Portland Area Office
Cascade Building
520 S.W. Sixth Avenue
Portland, Oregon 97204
(503) 221-2561

Seattle Area Office
403 Arcade Plaza Building
1321 Second Avenue
Seattle, Washington 98101
(206) 442-7456

CURRENT PROGRAMS

o Atlanta, Georgia

Atlanta is in the midst of constructing a modified pedestrian zone in a centrally-located 21 block area of its CBD. Centering around one of Atlanta's most historically and economically significant areas, the Fairlie-Poplar Mall will be fed by the bus and rail systems coming into downtown.

Contact: E. Larry Fonts
Vice President
Central Atlanta Progress
First National Bank Tower
2 Peachtree Street
Lobby Suite
Atlanta, GA 30303
(404) 658-1877

o Bellevue, Washington

In a few short years, Bellevue, Washington, grew from a Seattle suburb to a city in its own right, the fourth largest in the State. To stem the unwieldly growth in automobile use in the downtown, shape downtown land use, and make the downtown more appealing for pedestrian activity, the City has taken or will take the following actions. These are all a part of a CBD Action Plan that sets forth goals and objectives for CBD land use and development in the coming years (see Figure 1).

- o Floor Area Ratio (FAR) Amenity Incentive System. Floor area ratios were established as a method of determining development intensity. Developers may develop property in certain increments above the designated FAR as a bonus if they provide for the development of one or more of the amenities that the CBD Action Plan has identified as necessary to achieve the desired character of the City center.

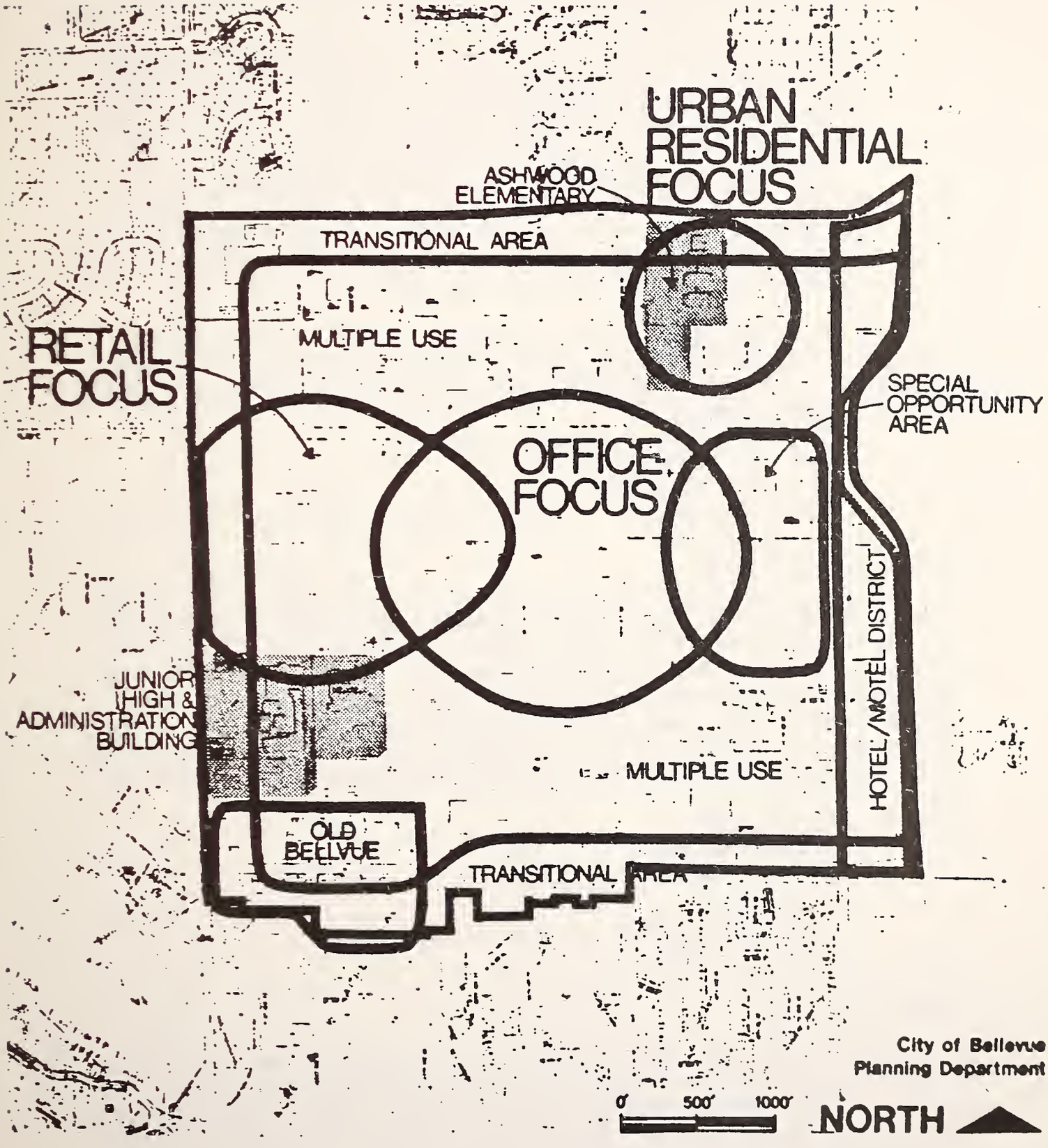
- o Pedestrian Mall. This will connect the centers of the retail and office core areas.

- o Transit Center. The Bellevue CBD needs a transit focus. Seattle Metro, the transit agency that serves Bellevue, needs an activity center around which to build service in that subregional area. Bellevue residents need greater access to transit service to relieve their dependence on private automobiles. A transit center in Bellevue will serve all these needs. An interim transit center with timed-transfer service during off-peak hours began operation in January 1982, and the preliminary design work for a permanent center is currently underway.

- o Parking Management. The City is imposing drastically reduced minimum parking requirements and new maximum parking require-

Figure 1

CBD SUBAREA PLAN LAND USE DIAGRAM



Source: T. Noguchi, City of Bellevue Planning Department

ments for new development. It is also scheduling a phased reduction of those requirements, and has instituted a system whereby a developer could propose reduction of up to 1/2 the minimum parking requirement if he or she provided for the implementation of programs to encourage the use of alternative modes, such as transit and carpools.

- Metro/Bellevue Transit Incentive Service Agreement. Seattle Metro refused to increase bus service hours in Bellevue until some of the above programs started having an effect on employment density, transit use, and pedestrian activity. At the same time, the City needed a guarantee from Metro that transit service would be provided before it could implement some of these programs. The incentive agreement resolved the problem by allocating new hours of bus service at a rate commensurate with measures of CBD employment density growth and net changes in parking availability (see Figure 2).

The City views these transportation elements as vital to its effort to change the land use in Bellevue from that of a suburban auto-oriented center to an urban activity center designed for people.

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- Boston, Massachusetts

Since 1978 Boston has restricted automobile use in one of its oldest and most important central retail areas, improving transit and taxi access to the area, increasing downtown retail sales, and enhancing the pedestrian environment. The City, the transit authority, the redevelopment agency, and local merchants have worked closely to reallocate scarce street space and to separate and facilitate both pedestrian and vehicular movement while improving the economic vitality of the retail area.

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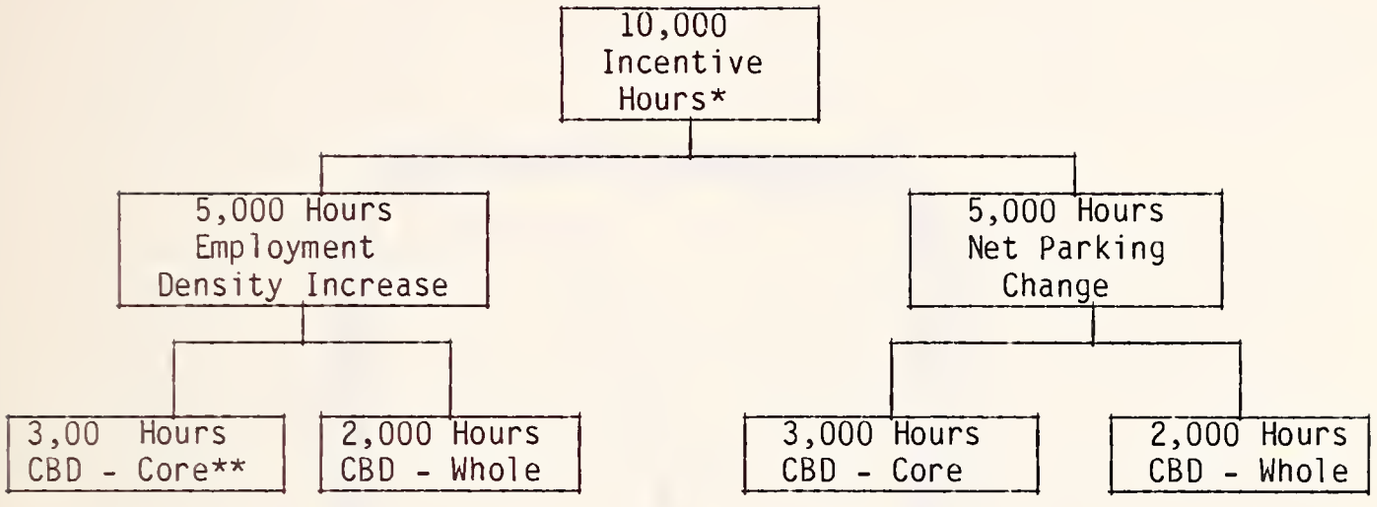
- Buffalo, New York

A 1.2 mile section of its 6.4 mile light rail system now under construction will form the main artery of downtown circulation in Buffalo. The 1.2 mile portion, extending the length of Buffalo's primary retail section on Main Street, will be at-grade, while the rest of the system will be underground (see Figure 3). The downtown service will be fare-free and will run along a vehicle-free mall that has six stations. The mall will be the main link between rapid transit,

Figure 2

INCENTIVE HOUR ALLOCATION RELATIONSHIP



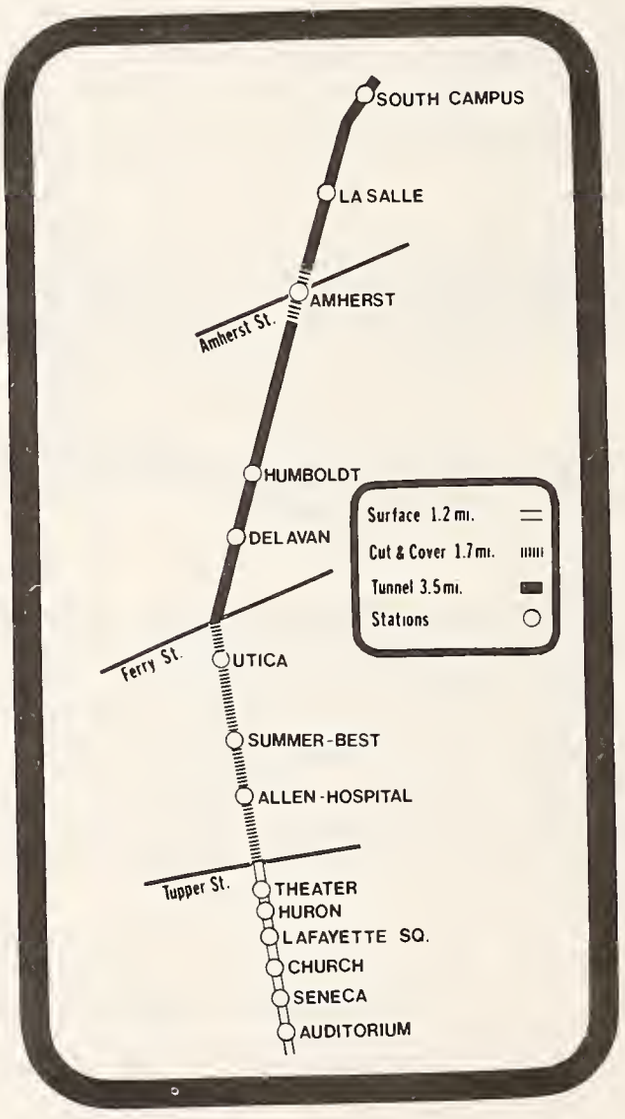
*Maximum possible over a two-year earning period; hours implemented are subject to evaluation after one year.

**Refers to Figure 1.

Source: T. Noguchi, Bellevue Department of City Planning.

Figure 3

MAP OF BUFFALO'S LIGHT RAIL SYSTEM



Source: Gordon Thompson, Niagara Frontier Transportation Authority, Buffalo.

parking, shopping, and office facilities in the downtown. Automobile traffic coming into the downtown will be detoured to a side street paralleling the mall. Most bus traffic that previously traveled on Main Street now will be rerouted to feed the nearest light rail stations outside of the downtown.

The light rail system will be combined with the bus system to form a fully integrated public transit network. When the light rail line is operational, selected bus routes will be altered and extended to provide a feeder bus network serving the rail system. This service will transport passengers to and from the rail stations where they can transfer free between modes.

The City's Comprehensive Plan originally called for a parking strategy to intercept automobile traffic that would work in conjunction with the light rail system and the mall to reduce downtown congestion. This strategy has been abandoned for now for political reasons. However, planners are attempting to make arrangements with local landowners for some parking capability on property adjacent to the stations at either end of the mall. The downtown project is already noted for its high level of citizen involvement in major planning and design decisions, and its ability to attract new development. So far, $80 million of office and hotel development has been invested.

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o Chicago, Illinois

Chicago's State Street Mall is a transit and pedestrian mall that restricts automobiles and truck traffic along a nine-block section of State Street in the heart of downtown Chicago.

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o Denver, Colorado

Denver's Regional Transportation District (RTD), serving a six-county area in Colorado, completed a restructuring of its route system in 1978 to provide better service to the 1.6 million people residing within the District's borders. RTD is now planning and constructing transit centers in areas of intense land use throughout the region. (See Figure 4). Many of these activity centers will be connected to the central business district by two new intercept facilities at the extremities of downtown Denver's new 14-block 16th Street Transitway-Mall.

Planners expect that the Transitway-Mall and intercept facilities, which should be fully operational by early 1984, will significantly reduce automobile congestion and air pollution in the downtown and allow the District to redistribute transit resources more equitably on a regionwide basis by making the downtown transportation system more efficient.

Since the Transitway-Mall will prohibit vehicles other than transit and emergency vehicles from using the mall, RTD has met with representatives of the City and with delivery firms operating in the downtown area to coordinate the most efficient freight delivery routes and schedules.

The traffic impact of eliminating automobiles from 16th Street, one of Denver's most important retail centers, to allow construction and operation of the Transitway-Mall has been tempered by making directional changes on several adjacent streets.

RTD has also entered into an innovative air rights development agreement for the Civic Center intercept facility that is expected to yield substantial revenue to the District over the next several years.

RTD serves the region and its activity centers with five primary modes of service:

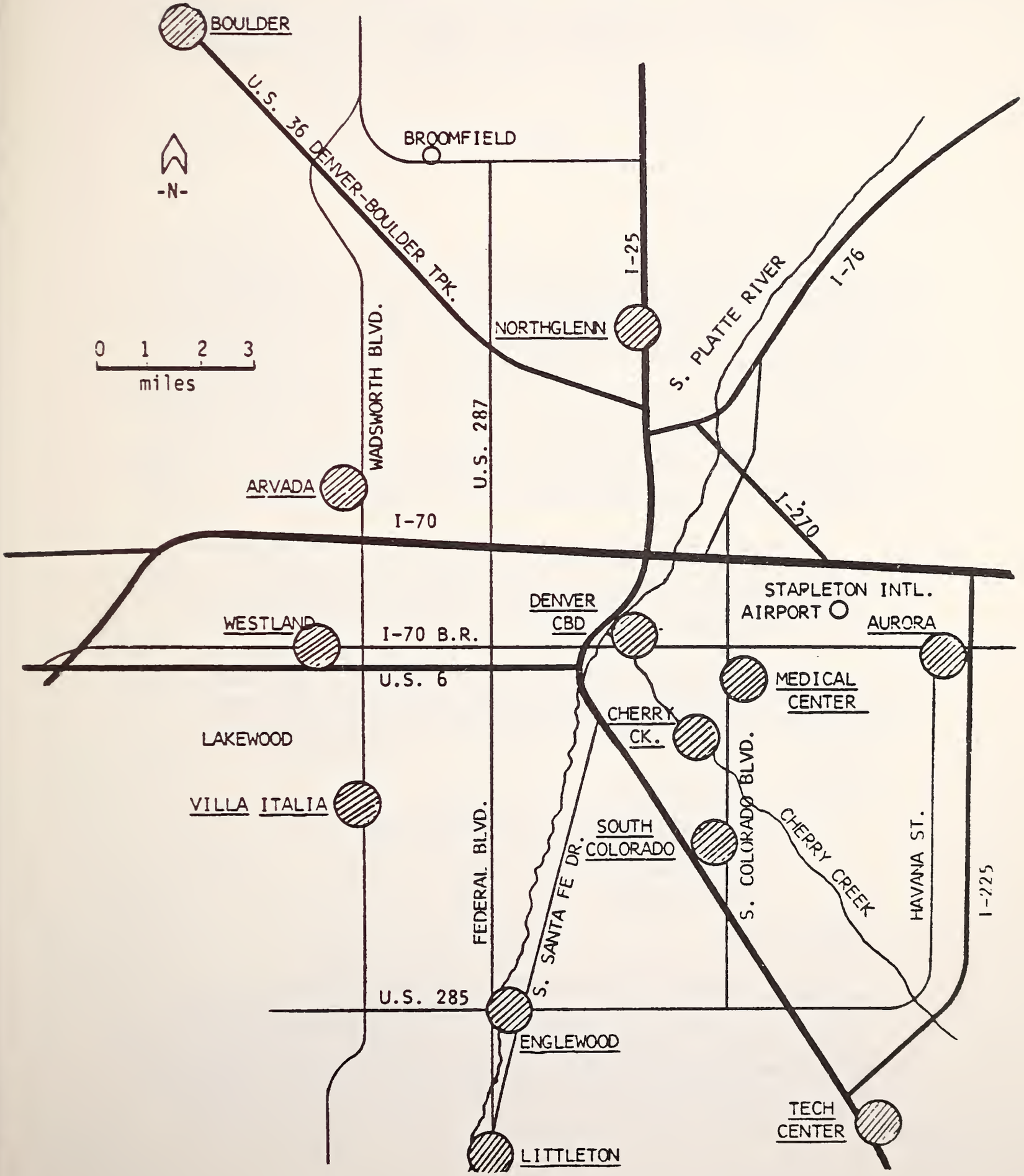
- Mall shuttle service will provide high-frequency, fare-free shuttle service using special electric- and diesel-powered vehicles that will run along the mile-long Transitway-Mall between the two intercept facilities.

- Circulator service provides for travel outside the central area of activity but still within the immediate community.

- Local routes make up the grid system that provides connecting links throughout the District.

Figure 4

DENVER'S 13 ACTIVITY CENTERS



- Express routes provide service from activity centers and park-and-ride facilities into Denver's CBD.

- Regional routes connect the outlying cities and towns within the District to the central hub of Denver.

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- Fort Wayne, Indiana

The Fort Wayne Public Transit Corporation (PTC) is now considering a proposal for a three block transit mall with transfer facilities at either end as part of a program to help redevelop the central business district by enhancing downtown development and decreasing vehicular congestion. This is Fort Wayne's second attempt to implement a project of this kind. The first attempt faltered in the early stages of planning due in part to minimal community involvement. The PTC has successfully accounted for this problem the second time around by establishing a Project Management Board to oversee project planning and implementation. The Board is represented by the PTC, the Chamber of Commerce, the redevelopment commission, the City Council, private businesses, neighborhood associations, and speical interest groups.

The mall would restrict automobile access, thereby leaving Calhoun Street, the main downtown thoroughfare, for pedestrian and transit use. Buses would pick up and drop off passengers along the mall, but would wait for passengers on some kind of coordinated scheduling scheme at the transfer facilities.

The proposal also calls for street widening, landscaping, and providing other pedestrian amenities and aesthetic improvements. Estimated costs for construction of the mall and the transfer facilities and for street improvements on adjacent street are $4.4 million.

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- Houston, Texas

In view of Houston's rapid growth and decentralization, the Metropolitan Transit Authority (MTA) has been working with area retailers and others to reorient the transit service network to reflect regional growth. A polynucleated radial network with transfer facilities situated at major activity centers, especially shopping

centers, will replace the current downtown oriented route structure. The intent is two fold: to make the retail component and the transit component mutually supportive and to improve regional transit service, thereby promoting its use as an alternative travel mode.

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- Long Beach, California

A program of transit and traffic improvements, known as the Downtown Transportation Project, is currently being implemented in Long Beach, California, to stimulate downtown urban renewal, make the transportation and high density land use functions mutually supportive, and create a focal point for and increase the operating efficiency of the regional transportation system. The Project includes the following elements:

- The First Street Transit Center -- all CBD bus routes will be rerouted to feed the two block center so that it becomes the hub of transit service and provides a convenient place for transferring.

- The two main streets flanking the transit center will undergo improvements so that they may serve as the primary transit streets feeding the center. Some of these improvements will include pedestrian and aesthetic amenities.

- Pedestrian Mall -- A third CBD street will become a pedestrian mall, served by a small rubber-tired tram, possibly electric, connecting the shopping, office, and retail centers with the convention, marina, and recreational facilities along the waterfront.

- Parking -- A 3,000 car public parking structure bordering the redevelopment area is also being built.

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- Lowell, Massachussets

A program of actions to reduce the dominance of the automobile and improve downtown circulation has emerged from a study to analyze the feasibility of an auto restricted zone (ARZ) in downtown Lowell, Massachussetts. The full auto restricted zone proposal is still under

consideration, pending some assurance of financial support. In the interim, a number of related improvements that may either lead to the ARZ or stand on their own are in various stages of implementation. They include:

- Rerouting truck traffic away from the major CBD commercial street and restricting the hours of goods delivery in the CBD.
- A one block transit mall to act as the central terminus for all bus routes and passenger waiting and information facilities.
- Extensive pedestrian and street improvements.
- A revamped parking management system to coordinate on- and off-street parking rates, fines, and enforcement.
- A downtown free-fare circulation shuttle bus connecting major CBD attractions and parking facilities.
- CBD traffic signal synchronization to improve traffic flow.
- Pedestrian walkway systems that minimize pedestrian and vehicular conflicts.
- Employer transit and parking promotions.
- Improved pedestrian and trolley systems for National Park tourists visiting the downtown area.
- Elimination of private automobile traffic on the major CBD shopping street, with its right-of-way reserved for transit vehicles. Funds for this last element have not been secured.

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- Miami, Florida

Miami's Downtown People Mover (DPM), now known as the Downtown Component of the Metrorail System (DCM), forms a 2.1 mile circle around the CBD. Its primary purpose will be to distribute passengers arriving at the Government Center Metrorail station--the only heavy rail station close to the core, but too far from it for passengers to reach the CBD on foot. There will be nine more stations on the DCM loop, many of which are being planned with parking facilities, and most of which interface well with the regional heavy rail system, the Interstate Highway System, and key activity subcenters in downtown Miami. Pedestrian access and local street access also will be accounted for at these stations.

Transportation improvements being considered for the future include:

- A bus terminal at one of the stations with a free transfer between the bus and the DCM system. This would be part of an overall effort to re-route buses going into the downtown around the periphery, forming major connections there with the DCM and the heavy rail systems. Planners believe further transit changes or traffic restrictions would not be politically acceptable at present.

- A multimodal terminal as part of the Government Center Station for inter-city, downtown, and regional transportation modes.

- Another 2.1 miles of the DCM, which would connect the downtown with an emerging hotel, retail, and office center north of the City and an office corridor south of the City .

- Pedestrian facilities to improve access to the DCM stations. The first stage of the DCM is due for initial testing in 1983.

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- Minneapolis, Minnesota

The Nicollet Mall in Minneapolis was completed in 1967. It is a two-lane, bi-directional, eight-block busway along Minneapolis' major retail street downtown. Sponsored in large part by the business community, the mall was originally planned to improve the retail sales activity in the downtown. Automobiles are banned except on cross streets, and taxis are allowed with certain restrictions. Transit traffic has tripled on the mall since it opened. The mall offers major design innovations and a high level of pedestrian amenities.

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o Philadelphia, Pennsylvania

Philadelphia's Chestnut Street Transitway, open since 1975, is a 12-block, 1-mile long mall, a portion of which is in the retail heart of the City. Most of the mall is two-lanes and bi-directional. Although it was intended to improve transit circulation, it has scored its biggest success in improving the retail environment in the downtown.

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o Pittsburgh, Pennsylvania

The September 1981 ground breaking for a three-level transit center in downtown Pittsburgh marked the end of a turbulent three generation planning process and the beginning of construction activities for the City's light rail system.

Pittsburgh's $480 million system, the downtown portion of which will be underground, will replace the trolleys, tracks, and overhead wires of the aging streetcar system, which many believe is one of the leading contributors to the City's sometimes massive traffic jams. The light rail system is part of the $600 million Renaissance II Program to revitalize downtown Pittsburgh.

The 1.1 mile downtown segment will link office buildings in the City's Golden Triangle with the three-level Midtown Station in the heart of downtown. The system will continue for approximately nine more miles above ground along reconstructed trolley lines in the southern suburbs. Passengers will also have the option of transferring at the Midtown Station to a second spur linking the downtown with the railroad station, where they may transfer again to a busway extending seven miles into the City's eastern suburbs.

The 1.1 mile downtown segment will perform a critical role in relieving the congestion on Pittsburgh's narrow street system. It is expected that turnaround time on the trolley system will be half underground what it is at street level.

An ambitious and thorough public relations campaign, spearheaded by a private sector group, will make every effort to minimize the perceived and actual upheaval during the three years of construction before the system becomes operational in 1984. Construction activities are being promoted as attractions, rather than distractions. A "Mayor's Task Force to Keep Downtown Open" has been formed to allow transit agency, parking authority, redevelopment authority, and highway department representatives to act as trouble shooters on potential traffic circulation and parking problems in the downtown during construction. An "Update Group" prints weekly notices for merchants and employers to keep them informed about what to expect. Implementation has been staged so that only one Christmas shopping season is affected, and streets are closed for 22 months only.

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o Portland, Oregon

The City of Portland and the Tri-County Metropolitan Transportation District (Tri-Met) have implemented a number of transportation measures that comprise one of the most comprehensive strategies for intercepting CBD-bound traffic, encouraging transit use, revitalizing the downtown economically and aesthetically, reducing air pollution, and spreading transit resources more efficiently. These include:

- The Mall, an eleven block transit and pedestrian mall in the heart of downtown. Well over 2/3 of Tri-Met's bus routes pass through downtown on the Mall, alleviating what was once a disastrous congestion problem and providing a convenient place for transferring between suburban, intercity, and shuttle routes.

- Fareless Square, a 300 block area in downtown Portland where transit rides are free.

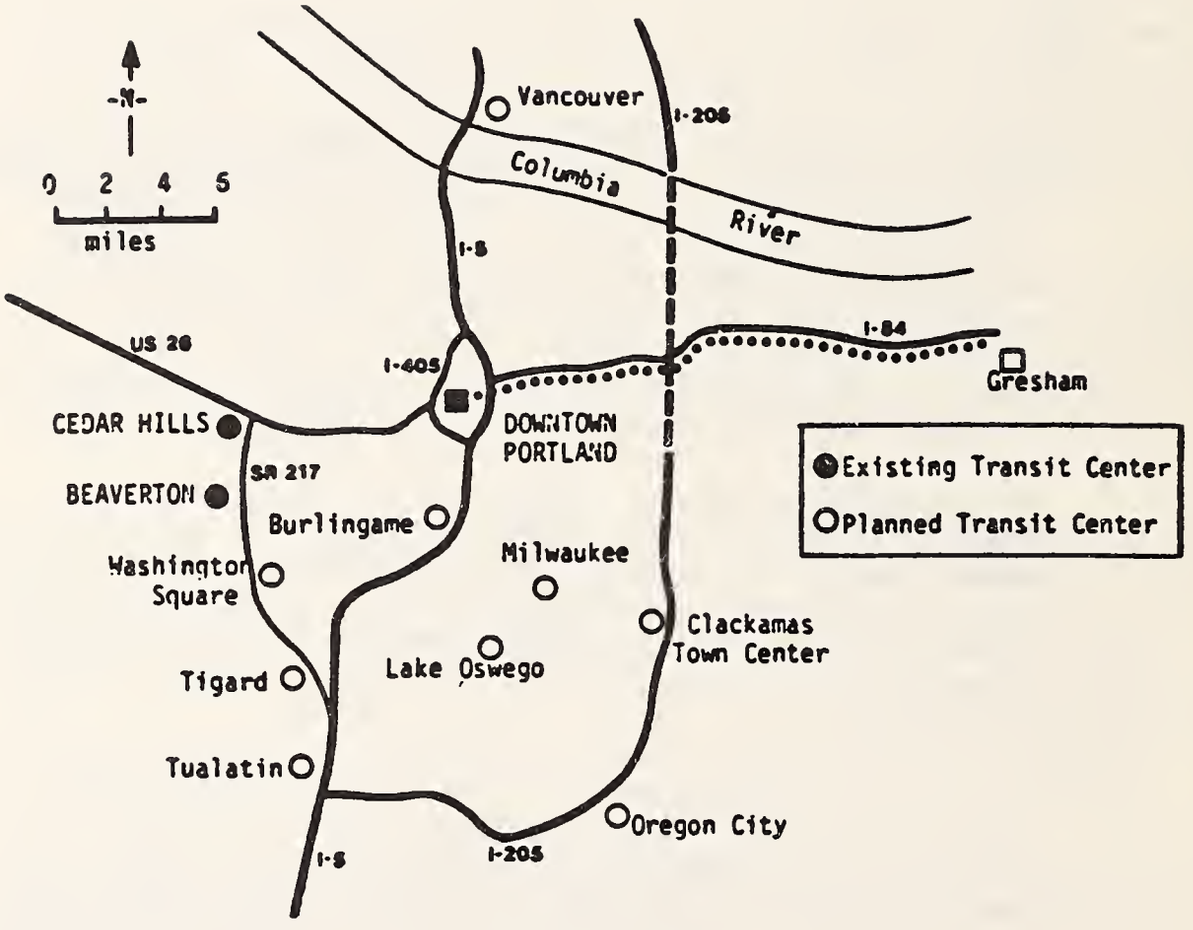
- Parking and circulation policy, which sets a ceiling on the number of public parking spaces that could be provided downtown. The policy allocates the remaining spaces to different sectors based on projections of transit and traffic use and classifies the city's downtown streets as either traffic access streets, non-automobile oriented streets, or local service streets.

- Transit center development in outlying activity centers, where the institution of timed-transfer service and route consolidation has allowed the transit agency to serve these centers and the surrounding areas more effectively. The two existing transit centers and the route and schedule restructuring that have taken place around them have been notably successful in meeting intra-suburban and commuter travel needs. Eventually, the southern and western parts of the City will be served by a network of 10 transit centers (see Figure 5), connected to each other and downtown Portland by trunklines, with local lines radiating from the transit centers into their surrounding communities.

- The Banfield Light Rail Line will be constructed to serve the entire northeast part of the city, and north-south grid bus lines will feed it.

Figure 5

TRANSIT CENTER IN PORTLAND



Source: Tri-County Metropolitan Transportation District

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- Rochester, New York

As a critical first step towards breathing new life into the downtown, planners in Rochester are beginning the engineering design phase of a Main Street Transit and Pedestrian Mall. The mall will eliminate automobile traffic in a significant two block area and facilitate the flow of transit. It eventually will be accompanied by a number of TSM measures, including a fringe parking lot program, a downtown parking management program, traffic channelization improvements, elevated pedestrian walkways, and CBD bypass streets. The transit agency has so far not agreed to transit routing changes.

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- San Francisco, California

The City of San Francisco Planning Department and the San Francisco Bay Area Transportation Terminal Authority are considering various options to expand the San Francisco Transbay Terminal to accommodate more buses. In expanded form, the terminal, which is situated at the base of the Bay Bridge connecting the East Bay with downtown, would more effectively intercept transit traffic coming into the downtown from the area's five major bus systems and funnel transit passengers onto Muni's light rail and bus systems operating within the downtown. Complementary efforts include:

  - Transit Preferential Streets Project. Operating since 1975, the project is attempting to improve the flow of transit traffic within the downtown by establishing bus priority lanes on seven congested San Francisco streets.

  - Center City Circulation Program. This is a planning effort that has identified a program of downtown transportation circulation improvements to consider for incremental implementation in the coming years.

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o Seattle, Washington

Serious congestion problems due to the long, narrow shape of downtown Seattle, pedestrian conflicts, the lack of an adequate downtown circulation system, and excessive noise have moved the City of Seattle and Metro Transit, the regional transit agency, to develop plans for a 1.5 mile downtown transit mall with two intercept bus terminals at either end and an efficient distributor system connecting them. Additional circulation elements, including use of Metro's existing fare-free Magic Carpet shuttle service, would be provided on parallel streets. Parking is also being considered at the terminal sites to serve downtown short-term needs, carpools, and vanpools. Preliminary planning was completed in early 1980 (see Figure 6).

A transit center development program for the outlying areas has also been designed to provide for new direct, non-downtown transit routings between transit facilities at outlying activity centers. Transit centers have been recommended for each of four designated activity centers. Three of the transit centers would be located at major regional shopping malls and a fourth at a suburban CBD (Bellevue). Two route types have been proposed to serve the transit centers: a local feeder system that would be timed to have buses meet every 30 minutes at the transit centers during the off-peak only; and a network of regional routes designed to connect the transit centers with each other and the downtown intercept facilities, as well as other destinations of regional importance.

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o Tacoma, Washington

Pierce County Transit has converted its radial service into a multi-focal point timed-transfer system. The conversion was inspired by expressed public dislike of having to come all the way downtown to transfer. Now, seven transit centers, each located at a major activity center in Pierce County, are served by local routes, which operate in a radial manner; intercommunity routes, which connect the transit centers; and inter-city routes, which connect five of the centers with areas outside of the Pierce County region. The service operates at 30 and 60 minute headways.

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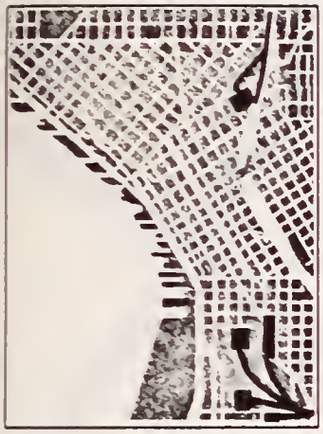
Figure 6

SEATTLE'S PROPOSED INTERCEPT STRATEGY



EXPRESS SYSTEM

CBD CIRCULATION

PEDESTRIAN SYSTEM

PEDESTRIAN FACILITIES

- Major Pedestrian Corridors
- Pedestrian Places
- Hill Climb Corridors

TRANSIT SERVICE

- Mall Shuttle
- 1st/5th/6th Ave. Circulator
- Regrade and Waterfront/ First Hill Circulator
- Express Routes
- CBD Bypass Routes
- Magic Carpet Zone

TRANSIT FACILITIES

- Transit/Pedestrian Mall
- Transit/Pedestrian Boulevard
- Intercept Terminal Sites
- Bypass/Express Stops,
- Waterfront Streetcar/Monorail

o Toledo, Ohio

Having originally considered a linear mall as a way to eliminate some transit congestion and spark revitalization in the downtown, transit planners in Toledo realized early in the planning process that a transit loop would fit the rectangular shape of downtown better than a mall.

Now nearing completion, the Toledo Transit Loop will ring in a 12 block area in the downtown and allow the 31 bus lines that previously traveled 15 different paths into the downtown to be rerouted around the loop. The loop is dotted with five color-coded transit centers spaced 1/5 of a mile apart around the 1 mile loop. All CBD-bound buses, similarly color-coded, will go no further than the loop, passing through all transit centers and exiting outbound at the transit center corresponding to their respective identifying colors. A system of weather-protected pedestrian walkways, financed substantially by private corporations in the downtown area, will serve as the internal circulation system. Nothing within the loop will be farther than a 3.5 minute walk from one of the centers.

Other features of the loop include:

- Fare-free. Buses have been retrofitted for two door exit and entry operations.
- Three of the five stations will have parking facilities to intercept automobiles, although there will not be any specific restrictions for impeding automobile traffic coming into the downtown, except on the loop.
- Outside the loop, additional bus routing changes were avoided to minimize passenger inconvenience and confusion.
- Since all the buses coming into the downtown pass through all of the five stations, transferring is more convenient. Figure 7 illustrates the shape of the loop.

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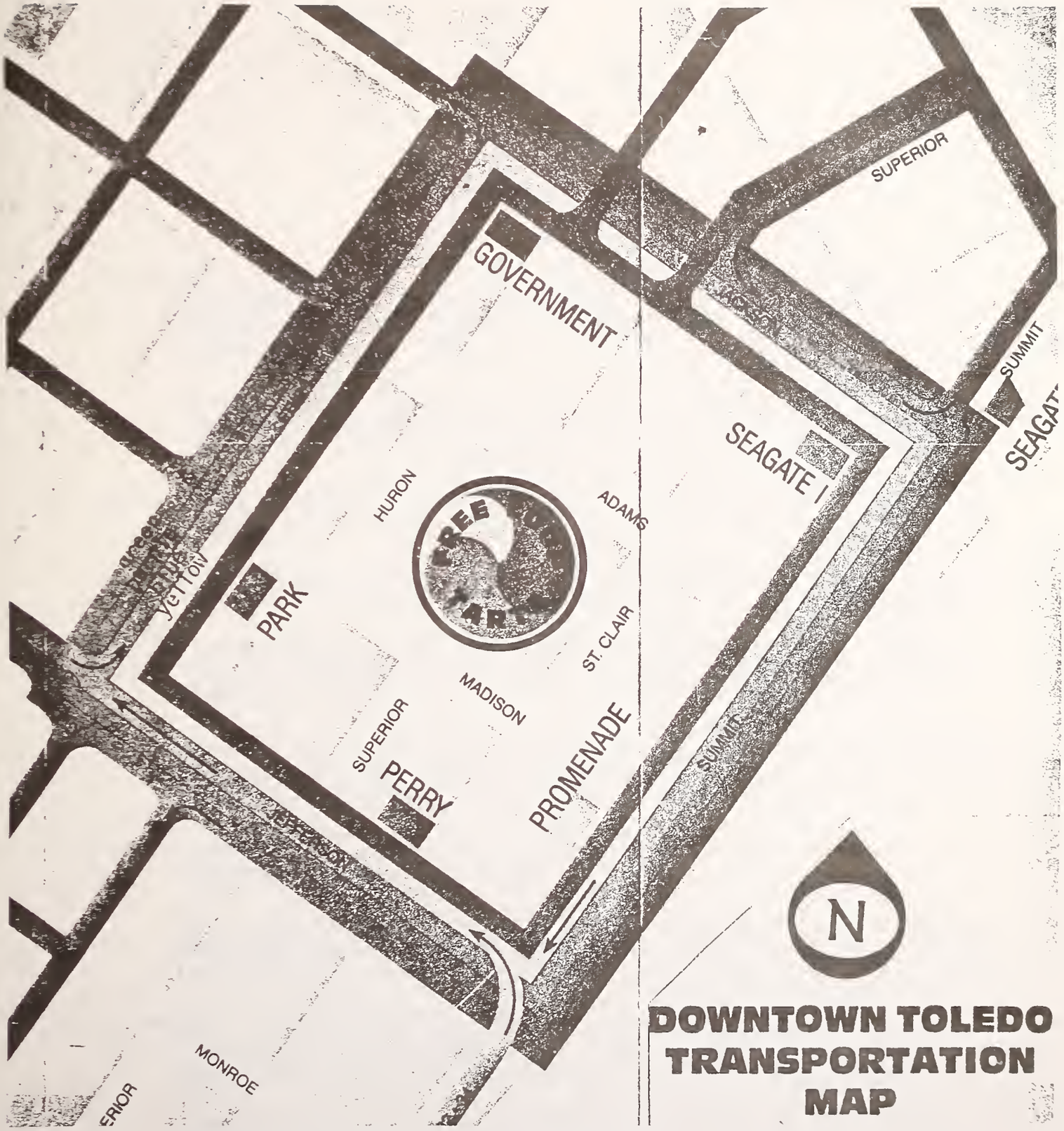
Figure 7

TOLEDO'S TRANSIT LOOP



Source: Toledo Area Regional Transit Authority

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Public Technology, Inc. Center City Environment and Transportation: Local Government Solutions. Prepared for the U.S. Department of Transportation. Washington, D.C.: 1979.

Shows how seven cities are using innovations in transportation and pedestrian movement as major tools in downtown revitalization and improving access to and mobility within central city areas.

_____. Center City Environment and Transportation: Innovations in Five European Cities. Prepared for the U.S. Department of Transportation, Urban Mass Transportation Administration and Office of the Secretary. Washington, D.C.: 1980.

Shows how five European cities are using innovations in transportation and pedestrian movement as major tools in downtown improvement.

_____. Economic Impacts of Transportation Restraints. Prepared for the U.S. Department of Transportation, Office of Technology Sharing. Washington, D.C.: 1980.

Addresses concerns among private businesses and local and regional government officials about the economic consequences of restricting automobile use in downtown areas.

_____. Transportation System Management, Air Quality, and Energy Conservation. Prepared for the U.S. Department of Transportation, Office of Technology Sharing. Washington, D.C.: 1980.

Provides an overview of the principal issues faced by local government officials as they develop and implement TSM strategies to deal with transportation, air quality, and energy problems at the local level.

Reiner, Martin A. and Sally G. Barrett. "Transit and Shopping Centers - The Houston Experience." Paper presented at the Transportation Research Board Annual Meeting, Washington, D.C.: January 1982.

Discusses the approaches the Metropolitan Transit Authority in Houston is using to expand the transit-retail interface in the Houston area, making the two mutually supportive.

Schneider, Jerry B. and Stephen P. Smith. "Synchrocentered Transit Systems: The Challenge of the 1980s." Transit Journal. American Public Transit Association, Washington, D.C.: Spring 1980.

Discusses how a transit system can be redesigned to better fit the city with many activity centers.

Schneider, Jerry B. Transit and the Polycentric City. Department of Urban Planning and Civil Engineering, University of Washington. Seattle: 1981. (Available as Report No. DOT-I-81-33 from Technology Sharing Program, U.S. Department of Transportation, Washington, D.C.)

Presents a balanced appraisal of the case for a reorientation of non-rail transit systems in response to the fundamental changes taking place in the structure of large urban regions.

Smith, Stephen P. "The Transit Center Concept as Applied in King County, Washington." Case Study No. 16. Prepared by the University of Washington Urban Transportation Program for the Urban Mass Transportation Administration, Office of Policy Research. Washington, D.C.: 1980.

Examines a transit center development program designed as an integral part of a long range transit plan for King County, Washington.

Thompson, Paul D. "The Transit Center Concept As Applied in Denver, Colorado." Case Study No. 21. Prepared by the University of Washington Urban Transportation Program for the Urban Mass Transportation Administration, Office of Policy Research. Washington, D.C.: 1980.

Examines the transit development program in Denver and the factors leading to the major route restructuring, showing how the operation of the grid structure can be aided by the development of transit centers in particular locations.

_____. "The Transit Center Concept as Applied in Portland, Oregon." Case Study No. 7. Prepared by the University of Washington Urban Transportation Program for the Urban Mass Transportation Administration, Office of Policy Research. Washington, D.C.: 1980.

Describes transit center design and service operating characteristics at the two existing transit centers, and future plans for constructing a network of centers, the light rail line, and park-and-ride facilities.

Transportation Systems Center, U.S. Department of Transportation. "Planning for Downtown People Movers, Volume I (Draft)." Cambridge: 1979.

Focuses on the concept stage of the DPM planning process, including sections on the development of goals and objectives, generation of alternative conceptual designs, familiarization with important planning issues, and crude feasibility studies of the alternatives.

U.S. Conference of Mayors. Auto in the City: An Examination of the Techniques Mayors Can Use to Reduce Traffic in Downtown Areas. Prepared for the U.S. Department of Transportation, Office of the Secretary. Washington, D.C.: 1979.

Examines the techniques mayors can use to reduce traffic in downtown areas.

U.S. Department of Transportation, Office of Service and Methods Demonstrations. Streets for Pedestrians and Transit: An Evaluation of Three Transit Malls in the United States. Washington, D.C.: 1979.

Quantifies the benefits and disadvantages of three major transit malls in Philadelphia, Minneapolis, and Portland.

_____. Office of Service and Methods Demonstrations. Streets For Pedestrians and Transit: Examples of Transit Malls in the United States. Washington, D.C.: 1977.

Acquaints the planning community with the concept of transit malls and provides information about several of the most important and interesting transit mall projects.

_____. Office of Service and Methods Demonstrations. Transit Operator Guidelines for Transfer Policy Design. Washington, D.C.: 1980.

Provides guidelines to aid transit operators in the design of policies to accommodate bus and/or rail transfers, based largely on the analysis of information obtained from an examination of

current or recent transfer practices at several transit properties in the United States.

_____. Urban Mass Transportation Administration. Draft Environmental Impact Statement, San Francisco Bay Area Transportation Terminal Expansion Project. Prepared in cooperation with the San Francisco Bay Area Transportation Terminal Authority. San Francisco: 1979.

Documents environmental impacts of proposed alternatives for expansion of the existing Transbay Transit Terminal:

_____. Urban Mass Transportation Administration. Planning and Designing a a Transit Center Based Transit System, Guidelines and Examples From Case Studies in 22 Cities. Prepared by University of Washington, Departments of Civil Engineering and Urban Planning. Washington, D.C.: 1980.

Examines the transit center concept to determine if and how it might be applied in American cities to provide more efficient and effective transit service on an areawide basis.

_____. Urban Mass Transportation Administration. Simplified Aids For Transportation Analysis, Technical Report Number Seven: Estimating Fringe Parking Site Requirements. Washington, D.C.: 1979.

Provides a method to identify candidate sites for change-of-mode fringe parking facilities, to estimate specific parking facility requirements at these sites, and to estimate highway access requirements for the sites.

Vuchic, Vukan R., Richard Clarke, and Angel M. Molinero. Timed Transfer System Planning, Design and Operation. University of Pennsylvania Department of Civil and Urban Engineering. Prepared for the Urban Mass Transportation Administration. Philadelphia: October 1981.

Gives an overview of different types of public transport services for low density areas and a detailed descriptin of timed-transfer system characteristics. Presents a systematic classification of timed-transfer system networks and relationships of their operating elements and a procedure for planning a timed transfer system.

Weisbrod, Glen. "Impacts of Auto Restriction Projects on Business Activity." Paper presented at the Transportation Research Board Annual Meeting, January 1982.

Examines the effects that auto restricted zones and street improvements have had on business entry and growth in areas where such projects have been undertaken.

Appendix A

INTERCEPT FACILITY DESIGN CONSIDERATIONS AND COMPONENTS

CONSIDERATIONS	COMPONENTS
o Efficiency of movement:	Total walk-time; total time in system; individual path analysis.
-- Crowding on links	Area/person in the space associated with a link.
-- Queues	Total delay time in queue, number in queue while traveling from one node to the next.
-- Conflicts	Measures of crossing flows.
-- Disorientation	Directness of path; availability of directional information.
-- Safety	Safety features on mechanical facilities; elimination of design hazards.
-- Reliability of system components	Back-up facilities in case of breakdown; inspection procedures.
-- Fare collection and entry control	Attraction to robbery or vandalism; inconvenience or disutility to user due to method; technology used.
-- Level changes	Number of levels; mechanical aids available.
-- Physical barriers	Difficulty in navigating fare collection-entrance control area; capability of users.
-- Space	Facility size.

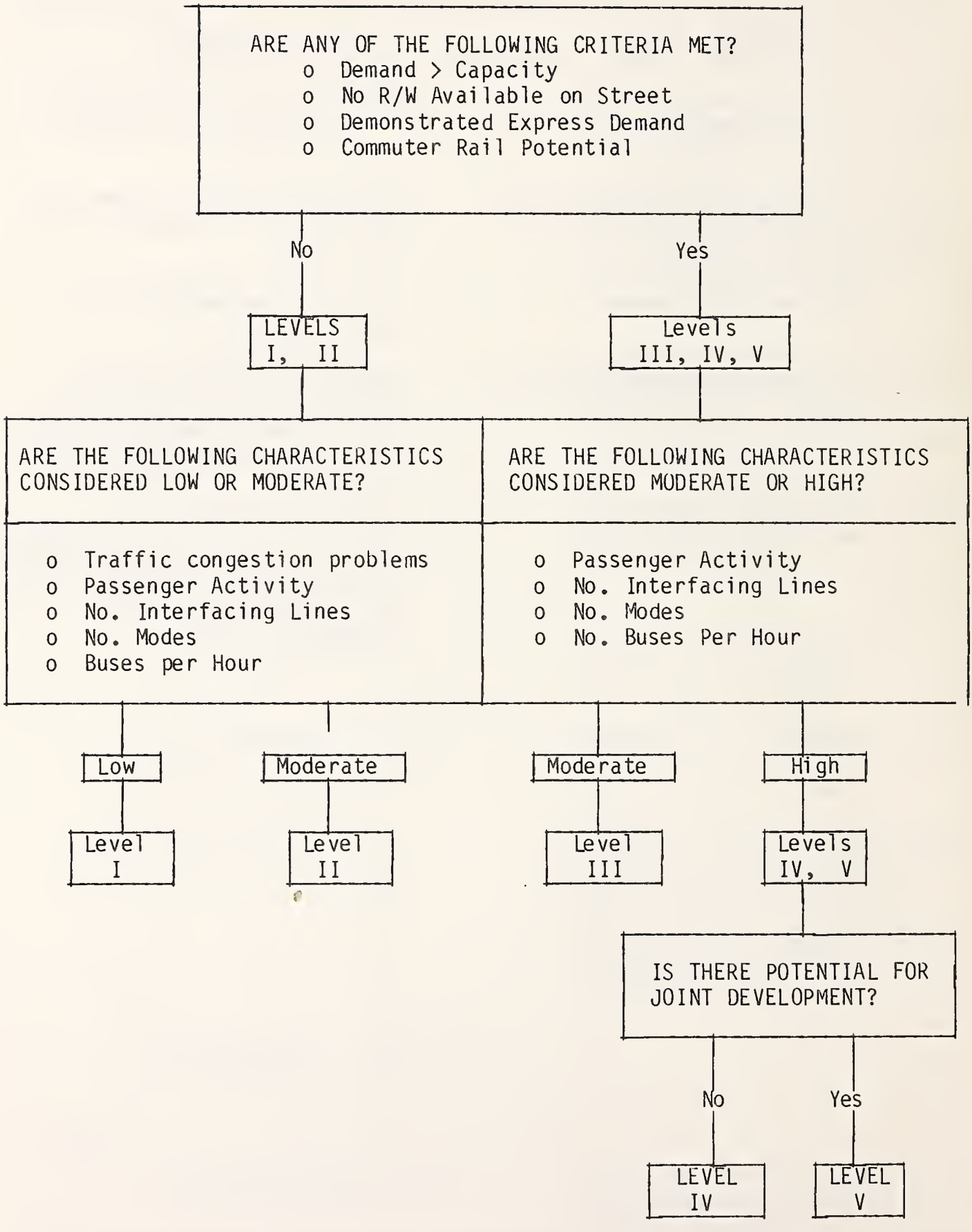
CONSIDERATIONS	COMPONENTS
o Comfortable, ambient physical environment:	Odors; suspended aerosols and particulates; in-flow of air; air contaminants; discharges from equipment room and control center; air velocity in public areas (through gratings or in passageways); rapid pressure changes; thermal comfort; noise.
-- Lighting	Passenger waiting and loading areas must be well-lit; maintenance; brightness ratios; glare; reflectivity; emergency lighting.
-- Personal comfort	Restrooms provided; rest areas provided; benches, water fountains, etc.
-- Clean and pleasant environment	Station finish materials; space for art displays, graphics, and visual
-- Supplementary services	Advertising; concessions.
-- Weather protection	Facility area exposed.
-- Security	Number of levels of facility; avenues of escape; number of exits from the facility; accessibility to major users' path, agents' booths, or fare collection areas; surveillance and security patrols.
-- Maintenance, cleaning, and replacement	
o Cost:	
-- Initial start-up cost; operating costs	Allocated funds; subsidy required; public investment; private investment.

CONSIDERATIONS	COMPONENTS
-- Return on incremental investment	Additional benefits or objectives desired beyond basic no frills design.
-- Revenue from non-transport activities: business, advertisements	Cost of facilities needed for activities vs. income received from them.
-- Energy utilization	Total and incremental energy requirements.
-- Joint development potential	Compatibility with community planning and land use goals; special zoning, percent of area that is for nontransportation activities.
-- Design flexibility	Vertical and horizontal expansion potential; flexibility of passenger processing and other activity configurations; modular components.

Source: Lester Hoel, et. al., Criteria for Evalauating Alternative Transit Station Designs (Washington, D.C.: 1976), pp. 11-14.

Appendix A (Cont'd)

TRANSIT CENTER LEVEL EVALUATION PROCESS
ORANGE COUNTY TRANSIT DISTRICT



Source: Orange County Transit District, Transfer Needs Study, as reprinted in U.S. DOT, Planning and Designing, p. 50.

Appendix A (Cont'd)

CRITERIA USED TO DEFINE CHARACTERISTICS OF TRANSIT CENTERS IN ORANGE COUNTY TRANSIT DISTRICT

QUANTIFIED CRITERIA FOR DETERMINING TRANSIT CENTER LEVEL

Category Description	Level V	Level IV	Level III	Level II	Level I
Bus bay demand/capacity	D>C	D>C	D>C	D<C	D<C
Potential for on-street expansion	No	No	No	Yes	N/A
Demonstrated demand for express service	Yes	Yes	Yes	No	No
Commuter rail interface	Yes	Yes	Yes	N/A	N/A
Traffic congestion - average daily traffic - service level	>20,000 D, E or F*	>20,000 D, E or F	>20,000 D, E or F	10,000-20,000 D, E or F	<10,000 A, B or C
Passenger ons & offs (total daily)	>2,000	>2,000	1,000-1,999	500-999	100-499
Number of interfacing lines (total)	>12	>12	8-11	6-8	4-5
Number of modes served (total)	>6	>6	3-5	3-5	2
Buses per peak hour (total)	>25	>25	15-24	10-20	5-9
Recovery buses per hour (peak)	>5	>5	>5	0-4	0-4
Scale of activity center	Regional or major	Regional or major	Major or community	Community	Community
Commercial use of facility	Yes	No	No	No	No

*A, B, C, D, E, F: represent the levels of traffic congestion according to the Highway Capacity Manual of 1965. Level A depicts an ideal full-flow condition; level F depicts worst forced flow condition, etc.

N/A: Not applicable

CRITERIA USED TO DEFINE LEVEL OF AMENITIES FOR TRANSIT CENTERS IN ORANGE COUNTY TRANSIT DISTRICT

PASSENGER AMENITIES ASSOCIATED WITH EACH TRANSIT CENTER LEVEL

Facility Amenities	Level V	Level IV	Level III	Level II	Level I
Benches	X	X	X	X	X
Information signs	X	X	X	X	X
Shelters	-	-	X	X	X
Enclosed or semi-enclosed structures	X	X	-	-	-
Concrete bus pads	X	X	X	X	X
Public telephones	X	X	0	0	0
Recovery (layover) area	X	X	0	0	0
Restrooms	X	X	0	-	-
Landscaping	X	X	X	0	-
Ticket and information booth	0	0	-	-	-
Bicycle racks	0	0	0	0	0
Lighting	X	X	X	0	0
Vending machines	0	0	0	-	-
Private carrier accommodations	0	0	0	0	-
Public parking	0	0	0	-	-
Commercial/office space	0	-	-	-	-

X = essential
0 = optional
- = unnecessary

Source: Orange County Transit District, Transfer Needs Study as reprinted in U.S. DOT, Planning and Designing, p. 51.

Appendix B

RELATIVE EFFECTS OF TRANSFER POLICY COMPONENTS ON FIVE FACTORS

COMPONENT	OPERATOR	COST	USER	RIDERSHIP	REVENUE
DISTANCE:					
Central on street transfer area	1	1	2	2	2
Off-Street transfer facility	3	3	3	2	2
Transit mall	2	2	3	2	2
Sub-Foci (bringing routes together outside central area)	1	1	2	2	2
Grid	2	1	2	2	2
Reduction of actual vertical distance	3	3	3	2	2
Reduction of perceived vertical distance (elevators, escalators)	3	3	2	2	2
TIMING:					
Schedule coordination	1	1	2	2	2
Dynamic Control					
a) alone	1	1	1	1	1
b) w/ other options	2	2	2	2	2
Simple timed-transfer	1	1	2	2	1

-: Has a negative effect in a given impact area.
1: Usually has a minor effect.
2: Effect varies substantially depending upon setting.
3: Has a major effect in most setting.

RELATIVE EFFECTS OF TRANSFER POLICY COMPONENTS ON FIVE FACTORS

COMPONENT	OPERATOR	COST	USER	RIDERSHIP	REVENUE
Pulse scheduling	2	2	2	2	2
Line-ups	2	2	2	2	2
Neighborhood pulse	2	2	2	2	2
Service frequency	2	3	3	3	3
Schedule adherence	3	2	2	2	2
COST:					
Transfer charge (+)	1	1	-2	-1	1
UNDERSTANDING:					
Schedule information	1	1	1	1	1
Marketing	1	1	1	1	1

-: Has a negative effect in a given impact area.
1: Usually has a minor effect.
2: Effect varies substantially depending upon setting.
-3: Has a major effect in most settings.
$: Effects a large reduction in cost.

Source: U.S. Department of Transportation, Office of Service and Methods Demonstrations, Transit Operator Guidelines for Transfer Policy Design (Washington, D.C. 1980), pp. 105-108.

SEATTLE METRO: DOWNTOWN SEATTLE INTERNAL CIRCULATION CONSIDERATIONS

- The Pedestrian-Transit Interface:
  (1) Access between the pedestrian and transit systems -- should be direct and frequent with as few grade changes as possible.

  (2) Vehicle entry -- boarding and alighting should not be delayed by sidewalk congestion caused by awaiting passengers.

- Impacts of a Vehicular System on the Downtown:
  (1) Noise -- should not interfere with sidewalk activity.
  (2) Air quality -- while not a health hazard, diesel fumes from transit vehicles may be offensive to other downtown users.
  (3) Visual appeal -- the aesthetic appeal, scale, and number of vehicles used in the system should be planned to add to rather than detract from the visual interest of the street scape.
  (4) Other sidewalk uses -- the system and its waiting, boarding, and alighting users should not interfere with other sidewalk activities, such as window shopping.

- Service Options and Operational Considerations:
  (1) Linkages -- the system should link all major activity centers or land uses in the downtown; ideally all potential origins and destinations would be within a two-block walk of the system.
  (2) Type of trip served -- the system should not attempt to compete with the pedestrian mode of travel for trips fewer than four blocks.
  (3) Stop spacing -- stop spacings of two blocks are ideal in high demand areas; if the route structure is more complicated as in a network or loop arrangement (see below), and yet boardings and alightings are clustered at a few stops, then stopping on request is more practical.*
  (4) Vehicle speed -- must be faster than people can walk to be competitive, but not so fast that it causes a safety problem for pedestrians; therefore, vehicle right-of-way should be sufficiently separated from pedestrian areas.
  (5) Headways -- two to three minutes is ideal during high demand periods. Anything longer than five to seven minutes will discourage system usage for many downtown trips.
  (6) Level of service -- should be variable depending on the time of day and changes in demand throughout the day.

---

* Transportation Systems Center, U.S. Department of Transportation, "Planning for Downtown People Movers, Volume I (Draft)," (Cambridge: 1979) p. 27.

(7) Routing -- should be simple and easy to understand. Routing configurations for the internal circulation system may either be independent of the regional system, joined only at the intercept facilites, or they may be continuations of regional lines that simply filter through the intercept facilites, picking up new passengers. An independent system is generally preferable, despite its greater operational requirements. It can take the shape of downtown travel demand more flexibly and it is easier to promote. Possible route structures include:*

-- Loop. this is most appropriate for cities where downtown activity is spread fairly evenly over a broad area.
-- Linear. This is most appropriate for cities with a high volume corridor where key land uses are strung out in a line.
-- Network. This is a multiple linear or loop system that is most appropriate for a city in which downtown activity is heavily concentrated on two or more intersecting corridors or is scattered over a wide area.

(8) Integration of existing elements -- the system should make use of the plant that is already in place or is planned; connections with the regional transit system should be as direct and convenient as possible.

(9) Expansion capabilities -- the system should have some flexibility built into it for possible future expansion either in hours of operation, carrying capacity, or service area.**

(10) Fares -- in cities where there is a clearly defined, independent internal circulation system, the fares range from 25¢ to free. Since the most often used alternative mode of travel is walking, the circulation system fare must be competitive.

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* Ibid., p. 26.

** Ibid., pp. 30-31.

*U.S. GOVERNMENT PRINTING OFFICE : 1982 0-381-428/2314

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Public Technology, Inc.

U.S. Department of Transportation

Public Techololgy acts as Secretariat to the Urban Consortium. The UC/PTI Transportation Project consists of the following PTI staff and consultants:

- PTI Project Staff:

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Special acknowledgement is due the following people and offices of the U.S. Department of Transportation for their invaluable suppport of this project:

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