



KANE COUNTY
LONG RANGE TRANSIT PLAN

APPENDIX F: SYSTEM STRATEGIES

TECHNICAL MEMORANDUM #4

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STRATEGIC APPROACHES

INTRODUCTION

This memorandum presents a set of transit system strategies available to address the public transportation needs identified in Kane County. These system-level strategies address transit services as well as supporting land use policies, parking policy and management practices, and methods to encourage transit use ranging from marketing to Transportation Demand Management (TDM) incentives. Appendix G (Technical Memorandum 6) presents funding strategies that could be implemented to carry out these system strategies. Appendix H (Technical Memorandum 5) highlights a set of specific system improvement strategies recommended for the Kane County Long Range Transit Plan.

STRATEGIC APPROACHES

This document presents the “toolkit” of strategic approaches available to address public transportation needs. The first part provides a set of regional and local service improvements. These potential service strategies are presented by route type, often based on the markets they serve. These are followed by non-service strategies including land use approaches and those aimed at encouraging greater use of transit.

Primary Transit Network (PTN) Service

A PTN is not a specific route system or a service plan, but rather a transit focus on key corridor segments and connections that, no matter how they are served, will form a high-quality network of transit services in Kane County. One of the most important elements of service on a fully implemented PTN is frequency of service – typically a bus every 15 minutes or sooner (“15-minute headways”). In addition, PTN service should cover a long service span and operate seven days a week in a market where there is high demand for travel throughout the day along a corridor with strong anchors. These elements of a PTN are narrowly focused on the densest corridors in the region, where potential ridership is highest. PTN service achieves high productivity by being useful to many people for many trip purposes. A PTN is also a policy tool to help focus transit-oriented development around corridors where transit can be provided cost-effectively. It would require a commitment from local municipalities and Pace to work together to provide the needed services, make the associated capital investments, and to foster transit-supportive development along the identified corridors – effectively bridging service and non-service strategies.

WHAT IS THE PTN?

Within Kane County and the neighboring region, the greatest ridership and community benefit will come from the PTN – a network of routes that run every 15 minutes all day. The PTN includes not just an investment in frequent transit service, but also serves as the foundation of a joint commitment to urban transit in which the local municipalities and Pace must act as equal partners.

The PTN is several things at once:

- A joint commitment, by both the municipalities and Pace to:
 - protect the speed and reliability of transit operations on these streets
 - sustain the basic 15-minute frequency all day, and for as much of the evening and weekend as can be afforded
 - market the network as the mobility solution for dense parts of Kane County
- A policy tool to help focus transit-oriented development around corridors where transit can be provided cost-effectively
- A basis for prioritizing physical amenities and other capital expenditures within Kane County, with the goal of creating a physical infrastructure that:
 - Supports the effort to protect operating speed and reliability
 - Provides an appropriate level of amenity given the intensive ridership at most stops
 - Creates a visibly distinct public infrastructure that visually conveys the permanence of transit in these corridors.
- A foundation for the eventual development of other high frequency modes

WHY IS THE PTN IMPORTANT?

The PTN has several key features which distinguish it from other local and regional services and help to establish its role as a long-term foundation for the system:

- **Ridership and Productivity Potential:** The 15-minute headway represents the point at which you no longer need to consult a schedule to use transit service. It also permits transfers to be made rapidly even without timing of connections. For these reasons, lines operating at, or better than this frequency or greater have the highest ridership potential.
- **Magnified Effects of Small Changes:** PTN services generate the greatest ridership but require the greatest investments from local jurisdictions and transit providers. Because of this, any changes that affect transit operations or attractiveness will be magnified. An amenity – such as a shelter – placed on the PTN will probably be used by more people, and will therefore have a greater positive impact, than the same shelter placed elsewhere. On the other hand, a delay imposed on a PTN line will cost the agency more, in terms of both running time and ridership, than the same delay imposed on a less frequent service.
- **Permanence:** The PTN is not just service; it's infrastructure. Integrated into the fabric of the community through good design and amenities, the PTN will be visibly permanent, something around which the community can continue to build with confidence.
- **Synergy with Land Use:** The PTN should provide a level of service that makes it possible to live without a car, or to have fewer cars than adults in a household, or for businesses to require fewer parking spaces. The PTN also establishes a land-use transportation nexus, identifying corridors where it is most cost effective to site new transit-dependent development, in terms of transit costs, because a high level of service is already there. In general, the PTN requires density to support the high level of service, and it also provides the opportunity for further densification.

HOW CAN THE PTN ENHANCE RIDERSHIP THROUGH LAND USE SYNERGIES?

The successful development of a PTN network will represent a profound investment in specific streets, expressed in both fixed capital costs and eternal operating costs. As Pace improves service in these corridors, local municipalities must make a commitment to maximize the value of this investment. There are two aspects of this:

- **Maximize ridership potential of the catchment area of PTN stops.** PTN corridors should be selected, in part, for the presence of high-density development and other transit-oriented uses, such as commercial. Future development on these corridors should also be high-density and transit-oriented, so as to maximize the value of the PTN investment. This requires cities to examine and modify long-term land use plans and zoning policies.
- **Avoid creating new transit demand away from the PTN.** Like the transit network as a whole, the PTN's quality will always be inversely related to its size, so it is important to have the minimum necessary network mileage, but no more. Two important recommendations arise from this:

- New transit-oriented development, and high-density development in general, will not reach its potential if it is not on the PTN. If the market needs more such development than the PTN can support, then plans should be made to expand the PTN into new areas, but with the commitment to developing a PTN corridor in all its aspects. It
- Transit-dependent uses should locate on the PTN, or in other areas with established service. Sometimes, an agency will locate a transit-dependent function (such as a social service office, a disabled workshop, etc.) in a place with no transit, and then demand that transit go there. There should be no such guarantee by Pace. The best way to ensure quality transit service must be to locate on the PTN. The next best way is to locate on another existing transit route.

WHAT ARE PTN SERVICE GOALS?

Span of Service

Even PTN service may have low-ridership trips and low-ridership periods, but these periods are important for maintaining the overall high productivity of a line. When cutting service, for example, transit agencies often try cutting individual trips because their ridership is low, but this is always a recipe for the gradual destruction of PTN service. For example, ridership on a 10 PM trip may be low in isolation, but if you cut the trip, you also lose the ridership of people who commuted to a job at, say, 3 am and then got off at 10 pm. Customers are also very reluctant to ride the last trip of the day because of the fear of being stranded if they miss it. For this reason, cutting the last trip usually kills the ridership on the preceding trip, which becomes the last. Service span, then, must be set in relationship to the economic life of the community. Service running 24 hours is ideal, but realistically, service spans should be generous enough to permit a rich and diverse life to be led relying on PTN service for all transportation. This “voluntary transit dependence,” which is much more common than it appears, is a crucial element of the long-term growth of PTN service, and of transit-oriented sustainability in the surrounding community.

The targeted span should look at the prevailing hours of service-sector businesses in the community – such as large-scale retail, typical restaurants, etc. -- and run PTN service from at least an hour before they open until an hour after they close, seven days a week. PTN service should also operate when people need to make connections to other transit services or local attractions when in operation. These services are also aimed at the “voluntary transit dependent” if the goal is to reduce local dependence on single occupant vehicles and therefore must operate seven days a week and over the economic life of the areas served.

Frequency of Service

The goal for the PTN service should be a 15-minute frequency over a long service span. This frequency represents a well-established threshold where the psychology of transit use changes: where service is less frequent, passengers must plan their trip around the schedule; at this frequency or above, passengers can go to a stop and expect that service will be along soon. This frequency also permits a more spontaneous connectivity between lines without the need for timed connections.

Service Strategies

The following service strategies are typically deployed to meet community transit needs. Figure 1 at the end of this section summarizes these strategies. They typically fall into three categories: productivity-oriented, coverage-oriented and commuter-focused, each addressing a particular goal for transit. Pace is inherently balancing the competing goals within the communities it serves.

PRODUCTIVITY-ORIENTED SERVICES

High Frequency Fixed-Route

This productivity oriented strategy provides high-frequency bus service, 15-minute headways or better, along dense corridors, connecting major activity centers. These routes form the cornerstone of a PTN and provide an alternative to the automobile for choice riders and a necessary service for transit-dependent riders. In addition to supportive land uses, these routes may require investments that improve transit speed and reliability, including bypass lanes and transit signal priority at controlled intersections, to quickly move transit through congested road segments. These routes may only serve limited stops where travel time is a critical goal, sometimes necessitating an overlay of additional service to serve every stop in the corridor, but at slower speeds.

Bus Rapid Transit (BRT) is a subset of this strategy characterized by several of the following components: exclusive busways or travel lanes; speed and reliability improvements; enhanced stations at a limited number of stops; easily identified vehicles; simple and direct route structures; simplified fare collection; and advanced transit technologies including traveler information onboard and at stations. Select BRT attributes may be employed to meet specific needs. Typically the speed and reliability improvements, without dedicated guideways, along with some service branding are used to develop Rapid Bus routes. Pace's plans for Arterial Rapid Transit (ART) implementation call for such strategies.

Moderate Frequency Urban Local Fixed-Route

Fixed routes providing 30-minute headways still address productivity-related goals. These are traditional bus routes providing communities with all-day service. For these routes to meet rigorous performance goals, the land use requirements along these routes are less than those required for the high frequency services, but are still higher than typically seen in Kane County.

COVERAGE-ORIENTED SERVICES

Low Frequency Urban Local Fixed-Route

These coverage-based routes tend to operate with 60-minute headways and provide needed services for transit-dependent populations. They are better suited for non-time critical trips and often do not provide evening or weekend service.

Community Shuttle/Circulator

Circulator or shuttle routes are often used to connect community-based travel demand centers. These can include shopping districts, residential developments and entertainment/cultural destinations. Circulators can be a vital element of larger strategies to provide mobility in downtowns, universities or other places attempting to manage traffic and/or parking demand. Shuttles can also be specialized in nature, such as employer shuttles that operate between employment locations and residential developments at the start/end of shift times.

Feeder Service

Feeder service is a form of circulator that primarily serves, or feeds into/out of a transportation hub – typically a Metra station in Kane County. These routes can circulate through neighborhoods and commercial areas, providing them a connection with other transportation services. Feeder service can also be used to create a more regional route between a distant park-and-ride facility and a Metra station. Schedules for these routes are often dictated by schedules of the connecting services and can be limited to commute times based on the underlying demand.

Flexible Service

Deviated or flex routes are hybrids of fixed-route and on-demand service, providing regularly scheduled service to fixed stops, but allowing for deviations off these routes to pick up additional

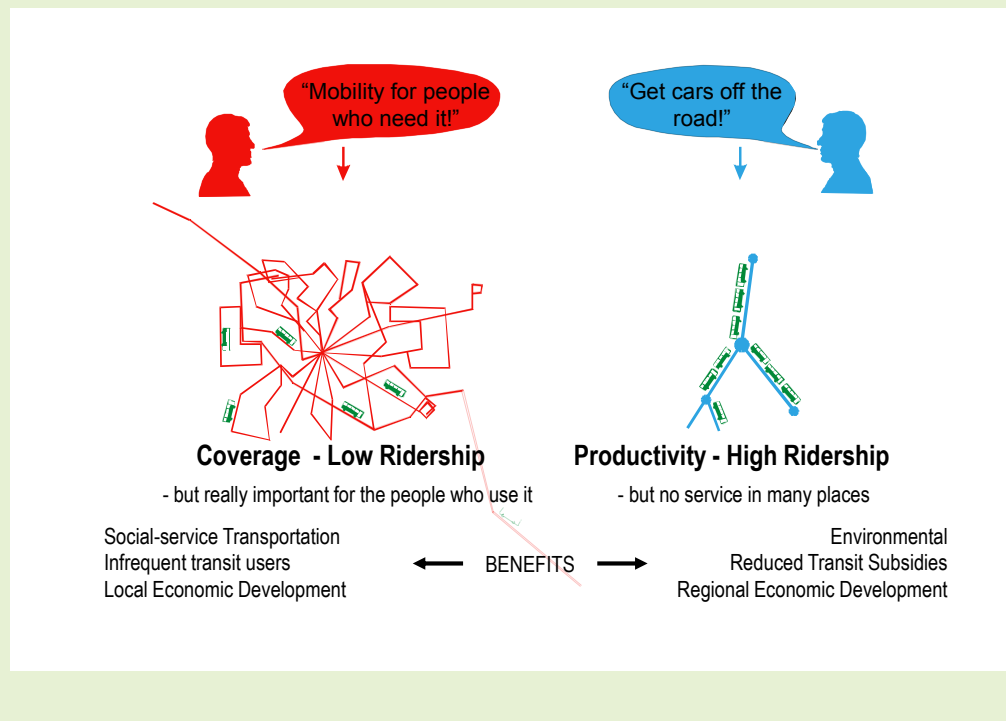
Productivity- vs. Coverage-Oriented Service

Productivity-Oriented Services

A productivity-focused strategy effectively maximizes ridership and increases system efficiency. This is often achieved with high-frequency, convenient service. Productivity, measured in boardings per revenue hour, is a basic measure of how much transportation the agency is providing in the community for its present level of investment. Productivity is financially important, because higher productivity means that fares pay a higher percentage of costs. Productive routes can help a region in meeting its air quality and congestion mitigation goals and offer an alternative to automobile travel. These services are typically the most expensive to operate as they require a larger number of buses and vehicle operators to provide the reduced headways (time between buses) required.

Coverage-Oriented Services

A strategy focused on coverage says that ideally, everyone should have access to the same level of transit service. The main problem with a coverage-based system is low ridership and productivity (boardings per revenue hours of service), which in turn means fewer benefits for the region in terms of air quality and congestion management. Low-frequency services, which tend to prevail in a coverage-based system, simply cannot compete with the automobile. This does not mean, however, that these are not important services. Coverage-oriented services play an important role in ensuring that transit dependent residents have access to key medical, social and other lifeline services.



riders that call ahead. These services are often used in lower-density communities that have a few high-demand stops but currently do not generate enough ridership for a low-frequency fixed route. These types of routes are often used in areas not served by ADA complementary paratransit, as the deviations address the needs of individuals that cannot access a fixed-route bus stop.

On-Demand Service

Demand-response service, also known as dial-a-ride, provides curb-to-curb service to passengers when and where they need it. Demand-response service can be an effective way to serve low-density areas, where there is not sufficient demand for fixed- or deviated fixed-route service. Advance reservations are typically required, although some immediate requests may be filled if time permits. Pace's Call-n-Ride routes are typical of this service type.

Demand-response transit is primarily used to serve older adults and passengers with disabilities, especially in areas where fixed-route service is unavailable. Systems, which are not available to the general public, have eligibility requirements limiting access to special populations. In areas without public transportation, general public dial-a-rides can meet some life-line transportation needs on an infrequent basis.

On-demand service may operate as a feeder service, connecting to and transferring passengers to fixed-route service, where appropriate. The use of on-demand feeders can limit the size of an on-demand service area and maximize opportunities for sharing rides.

On-demand service can be provided by Pace in the same form as their ADA complementary service, yet sponsored by local municipalities and non-profits (as in the Ride-in-Kane model) and/or through volunteer programs. Volunteer programs can help service rural areas or those community members with special needs. They can also greatly reduce costs but can require oversight to:

- Identify new volunteers with common recruiting efforts
- Provide consistent training for volunteers
- Help match volunteers with ride requests
- Promote volunteer programs to more community members
- Identify funding sources and opportunities for cost sharing

COMMUTER-ORIENTED SERVICES

Commuter Express

Commuter or express bus routes can operate between cities or over long corridors in larger cities. These types of services target commuters in heavily traveled and congested corridors, often offering an alternative to automobile travel. Travel time considerations are important in this market, typically limiting the number of stops en route.

Vanpool

Vanpool programs are a cost effective means for providing commute transportation to employment sites. Vanpools are particularly effective in serving downtowns or large employment sites where significant numbers of people are commuting to/from the same general area. In some areas, vanpool programs are typically managed by local or regional transit agencies (as is the case with Pace), which provide vehicles, fuel, maintenance and full insurance coverage but charge a fare which is divided among the passengers. Some employers subsidize vanpool fares as an employee benefit or when addressing congestion or parking problems. Each vanpool must supply a driver, who typically does not pay a fare. A vanpool is an attractive public transportation option in that it tends to be cost effective while providing a faster and more direct trip than bus transit. Vanpools can also meet the need of shift workers, provided the vanpool organizer can identify a critical mass of employees from a common location.

Figure 1 Summary of Service Design Policy Guidelines

Route Type	Service Description	Mode of Service	Density Along Route Requirements*	Anchor Requirements*
Productivity-Oriented Services				
High Frequency Fixed-Route	Frequent (15-minute or better), fast (limited number of stops), two-way service in densest corridors with quality anchors	Bus (Future Rapid Bus or Rail)	25+ persons/acre for ¼ mile radius around each stop	2 square miles of 50+ persons per acre or greater (Central City) 1 square mile of 40+ persons per acre (Regional Center)
Moderate Frequency Urban Local Fixed Route	All-day local service, 30-minute frequency of service	Bus	17+ persons/acre within ¼ mile of corridors served	2 square miles of 30+ persons per acre or greater (Central City) 1 square mile of 20+ persons per acre (Regional Center)
Coverage-Oriented Services				
Low Frequency Urban Local Fixed Route	60-minute frequency of service, primarily on weekdays	Bus	8+ persons/acre with ¼ mile of corridors served	Major trips generator (hospital, seniors center, etc.)
Community Shuttle/Circulator	Local circulation	Bus, Vintage Trolley, Mini-Bus, Van	2+ persons/acre within ¼ mile of corridors served Personalized to community or neighborhood demand centers	No anchors required, but large trip generators needed along route
Feeder	Local circulation with connection to regional transportation	Bus, Mini-Bus, Van	2+ persons/acre within ¼ mile of corridors served Personalized to community or neighborhood demand centers	Transportation Hub
Flex Bus	Local circulation with optional point-to-point service with curbside pickups/drop offs on demand	Bus, Mini-Bus	0.5+ persons per acre average in Flex Area	Major trip generators
On-Demand (Dial-a-Ride)	Point-to-point service with curbside pickups/drop offs on demand	Mini Bus, Van	Not Applicable	Not Applicable
Special Commuter Services				
Employer/Commuter Rail/Bus	Limited stop services serving one or two primary destinations	Rail, Bus, Commuter Coach	None if connecting to other transit services or park-&-ride facilities	Regional urban centers or local transit centers
Vanpools	Shared ride, driven by one of the passengers, typically to place of employment	Van	Not Applicable	Large employment centers, park-&-ride facilities or regional urban centers

* The measurement of persons/acre refers to the number of residents per acre plus the number of employees per acre.

Supportive Strategies

This section highlights a number of transit-supporting strategies to increase the propensity to use transit in Kane County communities. These approaches increase the overall demand for transit as well as reducing barriers to using public transportation. Land use plays a critical role in how much and how often people travel by each available mode whether by automobile, transit, bicycle or walking. Much research has been dedicated to optimizing the relationship between land use and transportation. Literature on this subject has come to characterize those features of land use and urban form that encourage more compact development by the shorthand of “the D’s.” Attainment of the five D’s results in the development of land patterns that support resilient, sustainable transportation systems and support a balance of modes:

- **Density:** Population and employment by geographic unit (e.g., per square mile, per developed acre).
- **Diversity:** Mix of land uses, typically residential and commercial development, and the degree to which they are balanced in an area (e.g., jobs-housing balance).
- **Design:** Neighborhood layout and street characteristics, particularly connectivity, presence of sidewalks and other design features (e.g., shade, scenery, presence of attractive homes and stores) that enhance the pedestrian and bicycle friendliness of an area.
- **Destination accessibility:** Ease or convenience of trip destinations from point of origin, often measured at the zonal level in terms of distance from the central business district or other major centers.
- **Distance to transit:** Ease of access to transit from home or work (e.g., bus or rail stop within $\frac{1}{4}$ – $\frac{1}{2}$ mile of trip origin).

Appendix D presents a series of best practices to facilitate travel by alternate modes through land use development, Transportation Demand Management (TDM), parking, and bicycle and pedestrian planning. The following strategies embody these and other key practices.

ENABLE AND ENCOURAGE MIXED-USE DEVELOPMENT

The separation of uses should not be stipulated along transit corridors and mixed-use development should be promoted along targeted transit routes. If developed in a compact and walkable form, the mixing of residential, retail, office and/or commercial activities in close proximity will encourage more pedestrian, bicycle and transit travel. And the trips generated by mixed-use development tend to be shorter in distance, helping to lower overall vehicle miles traveled in Kane County.

ENSURE TRANSIT-SUPPORTIVE ZONING AROUND TRANSIT CORRIDORS

In addition to promoting mixed uses, zoning codes should not constrain development densities along transit corridors or within areas targeted for Transit Oriented Development (TOD). There is a strong correlation between increases in population and employment densities and the use of transit. Zoning codes should also encourage quality access to commercial buildings by restricting deep building setbacks, away from transit stops and pedestrian paths.

UTILIZE DEVELOPMENT DESIGN GUIDELINES TO PROMOTE WALKABLE COMMUNITIES

Local municipalities should encourage safe and dignified pedestrian paths within their built environments. Walking must be safe, comfortable, and appealing – including from home to transit stops and from transit stops to final destinations – if community members are to seek out alternatives to automobile travel. Design guidelines can help promote interesting street-level facades that engage pedestrians whereas long stretches of high, blank walls create uninviting travel routes. The use of tree canopies, architectural features and awnings are other design elements that can be promoted via design guidelines to encourage walking.

MANAGE THE SUPPLY AND DEMAND FOR PARKING

The oversupply of parking is one of the greatest deterrents to the use of alternate modes of travel. Conversely, once the use of transit and pedestrian travel is enabled, limiting the supply of parking can encourage a greater use of non automobile travel and put the land that would have been dedicated for parking to more productive uses. Figure 2 contrasts a suburban view of parking, typical of most of Kane County today, with a transit-supportive parking environment that has a more urban character.

Figure 2 Suburban vs. Transit-Supportive Parking Perspective

Typical Suburban View of Parking	Transit-Supportive View of Parking
• It is assumed that everyone drives • There is separate parking for each store/building • Parking is free • Parking supply planned to meet worst case demands (i.e. to handle peak holiday shopping) • The pedestrian environment can make it difficult to walk even between nearby destinations • Streetscapes are oriented to the automobile	• The needs of drivers are balanced with transit users and pedestrians • Parking is shared between different uses • People may have to walk a short distance to their final destination (which encourages a vibrant commercial environment) • Demand for parking may be balanced with supply through pricing • Parking does not dominate the streetscape

Transportation options must be in place for the management of parking to be viable. This means that high quality transit service and supportive land uses are needed before parking strategies can be pursued. Approaches to managing parking include:

- Increasing parking maximum requirements and possibly specifying maximum levels
- Pricing parking
- Unbundling parking from residential and commercial developments and making greater use of shared parking facilities

Park-and-ride facilities for public transportation should undergo similar scrutiny to avoid an oversupply. Parking at transit stations/hubs should be part of a strategic plan where the parking performs a feeder function when local transit service does not adequately serve this function, or the parking facility and connecting transit service perform an intercept function limiting the number of drivers traveling through congested corridors.

PROMOTE COMPLETE STREETS

Municipalities and the County should be encouraged to implement a “Complete Streets” policy for roadways under their jurisdiction, to ensure that transportation planners and engineers consistently design and operate roadways with all modes in mind. The end goal should be a complete network of direct and convenient travel routes for transit, bicycles and pedestrians as well as automobiles. As discussed in the following callout box, a “Complete Streets” policy for state transportation facilities was enacted in 2007.

State of Illinois Complete Streets Act

The State of Illinois enacted “Complete Streets” legislation in 2007, responding in part to a bridge in Cary, IL, that was built in the early 1990s without a safe bike or pedestrian crossing and where the Illinois DOT was forced to subsequently retrofit the bridge with a side path. The law stipulates that “in or within one mile of an urban area, bicycle and pedestrian ways shall be established in conjunction with the construction, reconstruction, or other change of any State transportation facility,” with some exceptions.

More Information: CMAP Memo on IDOT Complete Street Implementation, April 2010. <http://www.cmap.illinois.gov/WorkArea/DownloadAsset.aspx?id=19619>

ENCOURAGE TRANSIT USE THROUGH TDM PROGRAMS AND MARKETING

Kane County, local municipalities and Pace should promote transit as a viable alternative and encourage its greater use. In addition to traditional and social marketing campaigns, the provision and promotion of public transportation is one type of Transportation Demand Management (TDM) strategy that offers people an alternative to automobile travel and lowers the demand for single-occupant vehicle travel. In addition, the availability of quality transit options can be used to leverage other incentive programs to further reduce the demand for single occupant automobile travel. Below is a general list of typical TDM programs aimed at encouraging transit use:

- **Transit Pass Programs:** Universal or broad-based transit pass programs have proven to be among the most effective policy tools for increasing transit ridership. Programs are often established with major employers, universities, and other large institutions, as well as business improvement districts. These passes typically provide unlimited transit rides on local or regional transit providers for a low monthly fee, often absorbed entirely by the employer, school, or developers. Due to the large enrollment of these programs, transit agencies can provide the transit passes at a deep bulk discount. However, pass programs are also viable for business or commercial districts.
- **Alternative work schedules:** Varying worker shift times allow more non-peak travel. Common alternative work schedule programs include:
 - *Flextime:* Employees are allowed some flexibility in their daily work schedules, e.g. starting at 7:30AM or after 9AM and leaving at 4 PM or after 6 PM.
 - *Compressed Work Week:* Employees work fewer but longer days, such as four 10-hour days each week (4/40), or 9-hour days with one day off every two weeks (9/80).
 - *Staggered Shifts:* Shifts are staggered to reduce the number of employees arriving and leaving a worksite at one time, e.g. one shift works between 8:00 and 4:30, another shift 8:30 and 5:00, and a third 9:00 and 5:30.
- **Telework or telecommuting:** Using telecommunications instead of traveling to work, including telecommuting, teleshopping, distance-learning, electronic government, video conferencing, etc.
- **Bicycle parking:** Providing bicycle facilities and improving connections from PTN routes into employment centers promote multimodal travel. Strategies that promote combined bicycle-transit trips include providing secure bicycle parking, storage, and changing facilities.
- **Guaranteed Ride Home:** Providing a guaranteed ride home in case of emergencies (typically via a taxi voucher), gives a sense of security to those that can walk, bike, ride-share or use transit as their commute mode and encourages the use of these transportation options. In practice these programs are rarely exercised.
- **Parking management and pricing:** Managing the supply of parking through shared parking programs, unbundled parking policies, regulating and pricing parking facilities, and discounted parking prices for carpools/vanpools can encourage a mode shift away from automobile travel.
- **Commuter financial incentives:** Offering cash incentives to induce a mode shift is a highly effective way to promote alternative commute options, and may include parking cash out, travel allowance, transit benefits and ride-share benefits. Under a parking cash-out requirement, employers must offer the cash value of free parking to any employee who does not drive to work. Offering employees the option of “cashing out” their subsidized parking space can incentivize employees to ride transit, bike, walk, or carpool to work, thereby reducing vehicle commute trips and emissions.

Federal and local programs are available to subsidize many of these financial incentives. The federal tax code allows employers to provide tax-free contributions toward employee transit and vanpool benefits. These “qualified transportation fringe” benefits can be deducted from corporate gross income for purposes of taxation when paid for by an employer. In addition, both the employer and employee save on taxes since neither pays federal income or payroll taxes on these benefits – up to a current limit of \$230 per month. Similarly Pace has initiated a new program called the Employer Commuter Grant which supports employers who encourage employees to travel to work in the Northeastern Illinois region via rideshare or public transportation. These employers are eligible for a grant of up to \$20,000 to subsidize a qualified Employee Commuter Program. The Employer Commuter Grant is managed by Pace with funds coming through the Illinois Department of Transportation.

CODIFY SUPPORTIVE STRATEGIES IN TRANSIT OVERLAY ZONES

Many of the transit supportive strategies can be embodied in local zoning codes, design guidelines and other development standards. The level of regulation required to support transit should be targeted in those areas identified as transit corridors and/or part of a larger primary transit network. The use of Transit Overlay Zones can help specify what areas of a city may be developed under such regulations.

Transit Overlay Zones

Overlay zones consist of regulations that address specific elements (i.e. zoning, development standards, design guidelines, etc.) in particular sub-areas of a city. Transit Overlay Zones are intended to promote the creation and retention of mixed land uses in areas with high potential for enhanced transit and pedestrian activity. Development standards in these zones are designed to encourage compact urban growth, opportunities for increased choice of transportation mode, reduced reliance on the automobile, and a safe and pleasant pedestrian environment. They help accomplish these goals by ensuring an attractive streetscape, a functional mix of complementary uses, and provision of amenities that support the use of transit, bicycles, and pedestrian facilities in these specified zones. Targeting these elements in a Transit Overlay Zone also avoids creating new transit demand away from the targeted zones.

The essential elements of transit overlay zones can include:

- **Land Use and Building Footprint:** Aimed at encouraging transit-supportive density and pedestrian-scale building design
 - Minimum Non-residential Floor-area Ratio (FAR)
 - Minimum Residential Density
- **Mix of Uses**
 - Permitted Uses: Uses explicitly permitted such as multi-family dwellings, retail and service establishments, etc.
 - Restricted Uses: Uses that are primarily oriented toward vehicular access such as heavy or light industry and auto oriented wholesale (i.e. car malls)
- **Pedestrian Environment:** Urban design to encourage an active pedestrian environment and connectivity
 - Internal and external pedestrian (and/or bicycle) connectivity
 - No minimum setback required and/or maximum setback
 - Active ground-floor uses
 - Minimum sidewalk width
 - Reduced parking requirements and restrictions on location and/or amount of surface parking
 - Street furniture and amenities
- **Bicycle Amenities:** bicycle parking, bicycle network facilities
- **Transportation Demand Management (TDM):** may be required for office or other uses in the zone (see p. 16 for details)
- **Open Space and Other Amenities**
 - Incentives (such as density, FAR, or height bonuses) provided to encourage transit-supportive practices, amenities, or other goals – parks or public space, affordable housing, public art, and sustainable design

Examples of Transit Overlay Zones:

- Massachusetts Smart Growth Toolkit: http://www.mass.gov/envir/smart_growth_toolkit/pages/SG-CS-tod.html
- Palo Alto (CA) Pedestrian and Transit-Oriented Development Overlay for California Avenue Train Station: <http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=13770>
- Eugene (OR) Transit-Oriented Development Overlay District: [http://www.eugene-or.gov/portal/server.pt/gateway/PTARGS_0_2_356476_0_0_18/Chapter 9.pdf](http://www.eugene-or.gov/portal/server.pt/gateway/PTARGS_0_2_356476_0_0_18/Chapter%209.pdf) (9.45, p. 232 of PDF)
- Vancouver (WA) Transit-Oriented Overlay District: <http://www.cityofvancouver.us/MunicipalCode.asp?menuid=10462&su>



BEST PRACTICES LAND USE

THE SHAPE AND DESIGN OF A CITY plays a critical role in how much and how often people travel by car. When neighborhoods are compact, and many of a person’s daily needs can be found within a few minutes’ walk, vehicle trips per household decline rapidly. As shown in Figure 3 and Figure 4, measurements taken from several major urban areas in the U.S., there is a very strong correlation between the density at which people live (measured in these graphs in households per residential acre), the number of vehicle miles per year that a household drives and how many cars it owns. As is illustrated in the two graphs, there is a sharp decline in the number of vehicles per household between about 8 and 20 households per acre, relatively low to moderate densities in any major U.S. city.

Figure 3 Residential Density vs. Vehicle Travel

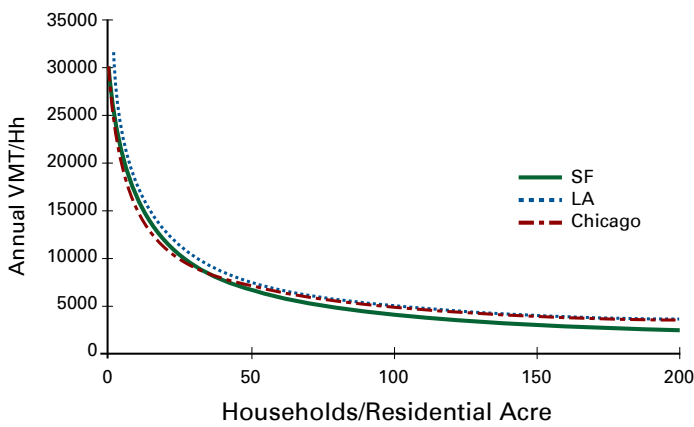
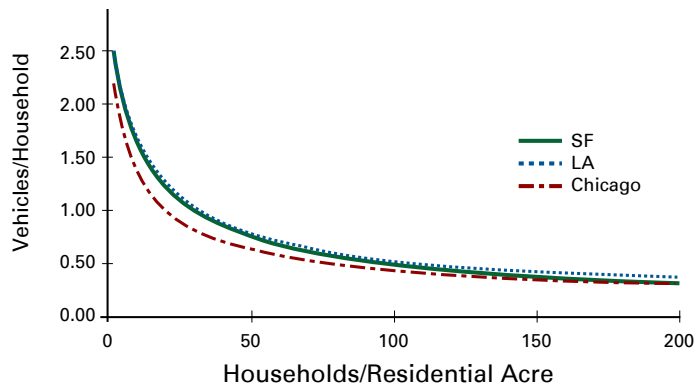


Figure 4 Residential Density vs. Auto Ownership



Source: Holtzclaw, J. Et Al (2002) Location Efficiency: Neighborhood And Socioeconomic Characteristics Determine Auto Ownership and Use – Studies In Chicago, Los Angeles And San Francisco. Transportation Planning and Technol., Vol. 25, pp.1-27

The most efficient transportation systems depend on supportive land use policies that promote various modes of transportation. Often when planners talk about “transportation-efficient land uses” or “increasing density to support active transportation,” people have the impression of high-rise condominiums or dense apartment complexes. This need not be the case. Very moderate infill programs that focus on accessory dwelling units and smaller multi-family developments at neighborhood centers or along major arterials can be enough to change a neighborhood from an auto-centric suburban neighborhood to a more self-supporting place that offers some walkable local services and amenities and supports quality bus service.

At the street or neighborhood level, good urban design, such as the creation of inviting pedestrian places, is also highly specific to the particulars of a site, and the effects of urban design on travel behavior—for example, lining a street with lively shop fronts, rather than a blank wall—often seem obvious to any pedestrian, but are frustratingly difficult for transportation researchers to quantify. The Pedestrian Best Practices section covers street and urban design practices that promote use of alternative modes.

THE FIVE D’S

Much research has been dedicated to optimizing the relationship between land use and transportation. Literature on this subject has come to characterize those features of land use and urban form that encourage more compact development by the shorthand of “the D’s.” Cervero and Kockelman (1997) initially wrote about three D’s, which are now commonly expanded to five. Attainment of the five D’s represent best practices in development of land patterns that support resilient, sustainable transportation systems that support a balance of modes:

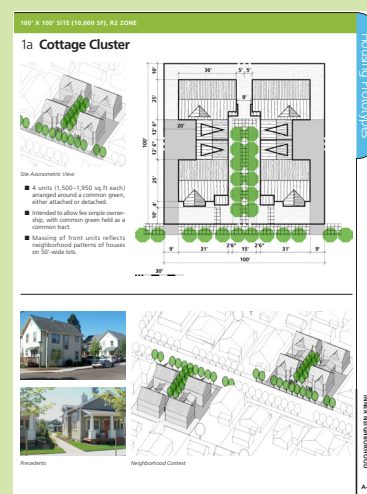
- **Density:** Population and employment by geographic unit (e.g., per square mile, per developed acre).
- **Diversity:** Mix of land uses, typically residential and commercial development, and the degree to which they are balanced in an area (e.g., jobs-housing balance).
- **Design:** Neighborhood layout and street characteristics, particularly connectivity, presence of sidewalks and other design features (e.g., shade, scenery, presence of attractive homes and stores) that enhance the pedestrian and bicycle friendliness of an area.
- **Destination accessibility:** Ease or convenience of trip destinations from point of origin, often measured at the zonal level in terms of distance from the central business district or other major centers.
- **Distance to transit:** Ease of access to transit from home or work (e.g., bus or rail stop within 1/4–1/2 mi of trip origin).

Case Study: Infill Design Project, Portland, OR ¹

The Infill Design Project in Portland, Oregon was created to improve the design of multidwelling and rowhouse development in neighborhoods outside Portland’s Central City. The project’s primary focus is development in the low- and medium-density multidwelling zones (R1, R2, and R3), located primarily along transit corridors, and similar development in commercial zones. Infill development provides needed housing for the residents of the growing city.

As part of the program, the City distributes the:

- **Infill Design Toolkit**, which highlights a wide range of design strategies for integrating infill development into Portland’s neighborhoods, focusing on medium-density residential development.
- **Infill Housing Prototypes**, which are suitable for medium-density infill sites, meet City regulations and design objectives, and are viable from a market perspective.



¹ <http://www.portlandonline.com/bps/index.cfm?c=34024>

Images from City of Portland, Bureau of Planning and Sustainability



Low-density areas, especially where there are strip malls and car dealerships, should be targeted as locations for infill development.

Image from www.bing.com

Land use patterns that are more supportive of transit and reduce the need for auto travel, particularly on short trips don't need to impact all neighborhoods. In fact, many optimal areas for mixed-use redevelopment are currently occupied by low-value structures in the form of strip malls or car dealerships (both in use and abandoned). These strategies should be targeted in major arterial corridors and where there are existing or developing neighborhood centers or retail nodes.

The following are some municipal code requirements or land use policies that cities have implemented in other communities to create or incentivize more compact, walkable urban form:

- Require transit-intensive uses to locate near existing high-quality bus service
- Provide developer incentives (including density bonuses) for mixed-use development, affordable and mixed income housing
- Reduce or eliminate minimum parking requirements along high quality transit corridors
- Require unbundling of parking from residential development in areas where quality transit service is available
- Require parking lot design standards which shield the pedestrian from parked cars with exterior landscaping/buffers
- Restrict parking between building entrances and the street
- Include ground floor commercial requirements to ensure pedestrian environment is interesting and active
- Mandate design requirements to reduce setbacks to bring buildings closer to streets
- Include pedestrian-supportive zoning strategies include allowing for mixed use, higher densities and smaller residential lots

- Provide allowances for sidewalk cafes and activities to increase vitality of pedestrian environment
- Bicycle parking location requirements which mandate parking be located in proximity to building entrances and with good visual access for security
- Require weather protection for bicycle parking
- Minimum bicycle parking requirements tied to square footage of a new building or to the amount of auto parking provides. Many cities have adopted ratios of bike accommodation tied to square footage of uses or residential units. Some communities such as Bend and Ashland, Oregon require automobile parking be matched with bike parking that is at least 20% of auto spaces. These requirements help support bicycle mobility and boost bike mode shares for local trips. Expanding this range can be very effective in filling in transit service gaps, and reducing parking demand tied to short- and medium range trips. Olympia, Washington, has adopted minimum required long-term and short-term bicycle spaces in its Municipal Zoning Code (18.38.100), although some of the minimum requirements may not be sufficient.



Providing incentives for mixed-used development near transit service promotes walking and transit use.

Image from Flickr user Lisastown. License info: <http://creativecommons.org/licenses/by-nc-nd/2.0/deed.en>



Requiring covered bike parking has been an effective way of promoting bicycling in many cities.

Image from pedbikeimages.org



BEST PRACTICES

TRANSPORTATION DEMAND MANAGEMENT

WHAT IS TRANSPORTATION DEMAND MANAGEMENT AND HOW DOES IT WORK?

Transportation Demand Management, or TDM, is a general term for strategies that increase overall system efficiency by encouraging a shift from single-occupant vehicle (SOV) trips to other modes of travel such as transit or bicycling, or by shifting auto trips out of peak periods when roads are most congested. TDM seeks to reduce auto trips – and hopefully total vehicle miles residents travel to accomplish their daily needs – by increasing travel options, by providing incentives and information to encourage and help individuals modify their travel behavior, or by reducing the physical need to travel through use of technology or neighborhood design. The cumulative impact of a comprehensive set of TDM strategies can have a significant impact on travel behavior, system efficiency, and SOV rates. TDM programs are usually implemented by public agencies, employers, or via public-private partnerships.

This section presents an overview of TDM issues and considerations. The sections that follow explore TDM strategies and supportive elements in more detail, discussing parking management, land use and design, as well as employer-based programs.



Madison, WI

Categories of TDM Strategies

Improved Transportation Options

Biking and walking

Transit and ridesharing

Incentives to Use Alternative Modes and Reduce Driving

Universal transit passes

Telework and flexible work schedules

Road and parking pricing

Road space allocation (bike lanes, transit-only lanes)

Parking Management

Parking cash-out programs

Priority parking for carpools, vanpools, and short-term parkers

EMPLOYER-BASED TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

reduce vehicle trips by providing employees with incentives, information, and additional transportation options to commute via modes other than a single-occupant vehicle (SOV), to commute during off-peak times of day, or even to eliminate certain work trips altogether. This transportation market is largely responsible for peak period congestion conditions twice each weekday. As such, modal shifts for these trips can significantly reduce regional vehicle miles traveled and carbon emissions, alleviate congestion during peak periods and improve air quality, all while making better use of the existing transportation infrastructure throughout the day.

WHY DO EMPLOYERS IMPLEMENT TDM STRATEGIES?

Cost Savings: Many companies are finding that it costs less to pay employees not to drive than it does to provide them with free or cheap parking spaces. Offering cash to employees who choose not to drive alone to work can amount to significant reductions in parking acquisition and maintenance costs.

Employee Attraction/Retention: Like free parking, many TDM strategies are essentially employee benefits that add to a company's appeal to potential and current employees. These benefits can also help hiring managers attract a broader range of job candidates, including working parents, students, or individuals without a car who require flexible schedules and commute options.

Tax Incentives: Transit subsidies can be deducted as a business expense. Pre-tax programs offer savings to employers as well as employees. When funds are removed from paychecks before taxes are applied, employers save on payroll taxes.

Regulatory Requirements: In some cases, employers implement TDM strategies in order to comply with local or state regulations, such as Washington State's Commute Trip Reduction Act. CTR law requires companies of a certain size to set SOV reduction targets and develop TDM plans for meeting them. Other cities have similar ordinances mandating TDM at the local level.

WHAT ARE THE MOST COMMON AND EFFECTIVE EMPLOYER-BASED TDM STRATEGIES?

Employer-Based strategies fall roughly into four categories:

1. **Financial Incentives:** This category either reveals the true cost of driving to the workplace, or makes non-SOV options relatively cheaper for the employee to use. Examples include:
 - **Realizing the True Cost of Parking:** While employers may provide free parking, parking is never free. Programs that charge for parking or allow employees to realize employer paid parking as a benefit are very effective strategies for reducing drive alone trips
 - **Overall Incentives to Reduce Parking:** allowing employees to purchase individual days of parking on a pro-rated basis comparable to monthly rates; providing a few free days of parking each month for employees who usually commute using a non-SOV mode; offering lower parking rates to carpools and vanpools; offering cash in lieu of free parking and allowing employees to make the choice
 - **Transit Subsidies:** Provision of free or subsidized transit passes, vanpool vehicles or fares, and/or shuttle services to reduce the cost of these high-capacity modes and create cost-competitive alternatives that make SOV commutes seem more expensive by comparison
 - **Pre-tax benefits:** Allowing employees to withdraw money from their paychecks before taxes are deducted, for use toward the purchase of transit passes or cycling gear
2. **Facilities and Services:** This category of strategies provides the necessary facilities, services or infrastructure to make non-SOV commute options more appealing and viable. Examples include:
 - **Bike and Walk Facilities:** Secure workplace parking for bikes, as well as shower and locker facilities that can also be made available for those who walk to work
 - **Preferred Parking for Carpoolers:** Provision of preferred spaces for carpool and vanpool vehicles
 - **Vanpools, Shuttles, and Car-sharing:** Provision of free vanpool vehicles, shuttle services, or car-sharing programs for employees so they do not need to bring a private vehicle to work
 - **Guaranteed-Ride-Home:** This employer-provided benefit allows for a set amount of free taxi rides or use of car-share vehicles for unplanned trips home that cannot be accommodated by the employee's normal commute mode (e.g., working late past last scheduled bus, carpool passenger with sick child at school)



Employers can support vanpooling and carpooling by supplying convenient parking, providing employee incentives, and promoting the programs company-wide.

Image from Nelson\Nygaard.



Guaranteed-Ride Home programs provide assurance to transit passengers that they can get home if there is an unplanned trip outside of their normal commute.

Image from Flickr user LFL16. License info <http://creativecommons.org/licenses/by-nd/2.0/deed.en>

Figure 5 Impact of Selected Employer-Based TDM Strategies

Strategy	Details	Employee Vehicle Trip Reduction Impact
Parking Charges ¹	Previously Free Parking	20-30%
Information Alone ²	Information on Available SOV- Alternatives	1.4%
Services Alone ³	Ridematching, Shuttles, Guaranteed Ride Home	8.5%
Monetary Incentives Alone ⁴	Subsidies for carpool, vanpool, transit	8-18%
Services + Monetary Incentives ⁵	Example: Transit vouchers and Guaranteed Ride Home	24.5%
Cash Out ⁶	Cash benefit offered in lieu of accepting free parking	17%

¹ Based on research conducted by Washington State Department of Transportation.

² Schreffler, Eric. "TDM Without the Tedium," Presentation to the Northern California Chapter of the Association for Commuter Transportation, March 20, 1996.

³ Ibid

⁴ Washington State Department of Transportation

⁵ Schreffler (1996)

⁶ Donald Shoup (1997), "Evaluating the Effects of California's Parking Cash-out Law: Eight Case Studies," *Transport Policy*, Vol. 4, No. 4, 1997, pp. 201-216. <http://www.commuterchallenge.org> (accessed November 2, 2007)

3. Flexible Scheduling: This strategy allows employees to reduce their number of weekly commute trips and shift work trips to non-peak hour times of day. Examples include:

- **Telecommuting:** Allowing employees to work from home or a non-office location one or more days a week
- **Compressed Workweek:** Enabling employees to compress regularly scheduled hours into fewer work days per week
- **Flexible Schedule:** Allowing employees to off-set work hours from the typical 9-5 standard and shift commute travel to off-peak hours

4. User Information: Employers can provide information on available alternatives to driving alone, through: a designated Employee Transportation Coordinator; use of print marketing; information kiosks; websites; ridematching services; and/or participating in employee-oriented informational/educational sessions on available transportation options. Employers can benefit if they are able to reduce the number of employee parking stalls they are required to provide.

WHAT ARE TRANSPORTATION MANAGEMENT ASSOCIATIONS?

Transportation Management Associations (TMAs) offer customized commute planning, commute benefits consultations, and information on ridesharing, transit, and non-motorized transportation free of charge to all businesses. These TMAs partner with governments and transit agencies to develop programming, marketing, and incentive programs for employers and employees alike. These organizations represent opportunities to broaden the reach of TDM programs and bolster the effectiveness of individual employer efforts.

Sources:

Schreffler, Eric. "TDM Without the Tedium," Presentation to the Northern California Chapter of the Association for Commuter Transportation, March 20, 1996.

Shoup, Donald (1997), "Evaluating the Effects of California's Parking Cash-out Law: Eight Case Studies," *Transport Policy*, Vol. 4, No. 4, 1997, pp. 201-216.



BEST PRACTICES

PROMOTING PEDESTRIAN TRAVEL

WHY PROMOTE WALKING?

New transit service, car-sharing programs, and enhanced bike routes all offer alternatives to driving alone. Importantly, making walking routes enjoyable above and beyond ensuring safety is crucial to the success of these alternatives. In order for residents to choose alternatives to driving alone, walking must be comfortable and appealing, whether to and from transit stops or between final destinations. Enhancements are particularly effective in downtown areas, but should also be made throughout a region.

Enhancing the downtown walking environment is not only key to a successful multi-modal transportation plan, but also spurs tourism and economic development by drawing greater volumes of foot traffic through commercial districts. Building high-quality pedestrian spaces also bolsters social equity by expanding access to amenities and making this cost-free mode of transportation more pleasant and attractive to people of all incomes and ages. Also, promoting walking supports public health objectives by encouraging daily moderate physical activity for residents, employees, and visitors. In line with climate protection and air quality goals, walking can replace short driving trips, reduce vehicle cold starts that create the greatest amount of pollution, and connect riders to high-capacity transit for longer trips.

WHAT ELEMENTS INCREASE AWARENESS OF PEDESTRIAN-FRIENDLY ZONES?

Studies have shown that when pedestrians and drivers are aware of and attentive to each other's presence, the crash rate declines. Strategies that raise awareness of pedestrians and improve visibility for people driving and on foot may be considered for additional implementation. These include:

- **Special or raised paving at crosswalks** assist in calming traffic and raise driver awareness that they are in a zone where pedestrians are expected to be crossing.
- **Pedestrian-only crossing phases** during signal cycles allow pedestrians to cross the intersection in any direction while all vehicles are stopped with a red light.
- **Leading pedestrian interval** gives pedestrians a few second head start to claim the right-of-way ahead of turning traffic.
- **Prohibiting right turns on red** prevents vehicles from turning into crossing pedestrians. Signal phases need to accommodate adequate time for through movement to reduce the urge to violate the no-turn-on-red
- **Reducing intersection widths** improves visual contact between drivers and pedestrians and reduces crossing distances and the time needed to cross on foot.



A pedestrian-only phase in the signal at Pike Place Market in Seattle allows pedestrians to cross in all directions while cars are stopped. Special brick pavement through the intersection provides a visual and tactile reminder of the crosswalk. Vehicles cannot turn right during a red light at this intersection, so pedestrians are free to cross with less threat of being hit by a turning car.

Image from Nelson\Nygaard.

“Curb bulbs” and “road diets” are two measures that affect crossing widths. “Curb bulbs” extend a section of the sidewalk into the road at an intersection.

- **Curb bulbs** are often placed at the end of an on-street parking lane. Pedestrians standing on the bulb can see and be seen by drivers before crossing.
- **Road diets** reduce the width or number of travel lanes, often by converting a 4-lane street into 2- or 3-lane plus bike lanes, widened sidewalks, and/or a center turn lane. This reduces crossing distances, vehicle speeds, and the number of travel lanes pedestrians must negotiate when crossing. Road diets are common treatments along roads with four or more lanes or that provide poor pedestrian and bicycle conditions.

Over and above improving safety, each of these practices also conveys a message to both drivers and pedestrians that the downtown is intended to be visited on foot. Motorized traffic will be more aware and attentive to potential pedestrians, and people on foot feel more comfortable and invited to walk in an area offering multiple pedestrian-focused design elements.



Source: Nelson\Nygaard

WHAT ELEMENTS IMPROVE THE QUALITY OF THE PEDESTRIAN EXPERIENCE?

Beyond issues of accommodation, elements that create additional comfort, aesthetics, and amenities contribute to a pleasant pedestrian experience. If the pedestrian environment is unpleasant, people will tend to avoid walking. This can lead to the weakening of neighborhood shopping districts, the loss of locally-owned businesses, and increased traffic burdens.

Cities can work to create lively zones by following best practices for elements that promote healthy, dynamic, and enjoyable walking environments:

- **Active sidewalks and transparent building facades.** Buildings and streetscapes that activate the environment, such as sidewalk cafes and parks, build community and stimulate the desire to walk to reach destinations. Transparent building facades with windows at street level create interest and also open up the pedestrian realm, so people are not forced to walk beside an imposing blank wall. Land uses that attract pedestrians include pubs, grocery stores, and parks.
- **Human-scale sidewalks.** Sidewalk widths should be proportional to the height of buildings and roadway size. Where multi-story buildings and multi-lane roads are present, sidewalks must be wider in order to counteract the bulk of the buildings and create a pedestrian realm in proportion to the scale of the automobile travel lanes. First story building articulations between storefronts, tree canopies, and awnings and overhangs create a human-scale space for walking.
- **Visual interest and diversity.** Diverse environments attract people on foot. This includes diversity in land use and shop types, architecture styles, landscape designs, and people.
- **Attractive and distinctive sidewalk treatments.** Unique sidewalk surfaces are placemaking elements that add interest to the walking environment. Defined connections between buildings and the adjacent sidewalk direct foot traffic to entrances and extend the pedestrian realm from the sidewalk to the building.

Road Diets reduce the width of a travel lane in order to slow traffic speeds and improve pedestrian and bicycle conditions. In a 4-to-3 lane road diet, a four-lane street is restriped with two travel lanes plus a center turn lane and bicycle lanes or on-street parking may be provided if not already present. Wider sidewalks, street trees, and curb ramps may also be added to enhance the attractiveness, comfort, and accessibility of the walking environment. Road diets improve safety by calming traffic and increasing visibility to all oncoming traffic. Vehicles waiting to turn left are directly offset, providing turning vehicles with a view of all oncoming traffic.

In the image at left, evidence of roadway restriping for a recent 4-to-3 Road Diet is still visible on South Grand Boulevard in St. Louis (MO). Examples of other cities that have implemented successful road diets include San Francisco (CA), Seattle and Kirkland (WA), Portland and Salem (OR), Helena (MT), Sioux City (IA), and East Lansing (MI).

Street trees, awnings, and a wide sidewalk create a pedestrian space scaled to the height of people on foot and in proportion to building bulk and street width. Transparent windows and first-floor building articulation break up imposing buildings into human-scale, inviting pedestrian streetscapes.



Seating, plants, and active street-level windows are attractive to people on foot.



Colorful pavement patterns create a gateway from the building entrance to the outside pedestrian realm.

Images from Dan Burden, pedbikeimages.org (top left); Nelson\Nygaard (top right and bottom)

- **Urban nature.** A tree canopy that provides shade and shelter and defines an “outdoor hallway” also helps achieve balance between pavement and planted areas. Grass strips, planters, and visible use of rainwater as a resource further reintegrate ecological functions into the urban realm and draw visitors.
- **Pedestrian furnishings such as seating and weather protection, water fountains and trash receptacles, and street trees and other green elements invite foot traffic.** These amenities create usable places for people to rest, to reflect, to have a sense of refuge, to meet and greet, and to see and be seen.
- **Wayfinding.** Street signs, maps, and unique area treatments such as historical displays and public art help pedestrians orient themselves and create interest and comfort. Streetscapes that are inherently easy to navigate invite travel by foot and make driver and pedestrian behavior more predictable and thus, safer.
- **Public Art.** Installations of street art along walking and transit routes add an element of interest and for pedestrians. Public art can help create a sense of place and inspire civic pride.
- **Minimal auto-centric land uses and cuts across sidewalks.** Car-centric land uses, such as parking lots and garage entrances, introduce hazards and psychological barriers to people on foot. Driveways across the sidewalk should be minimized whenever possible. Vehicle driveways should not interrupt the sidewalk’s grade and should be made of sidewalk material so it is clear to drivers that they are crossing a pedestrian zone. Entrances designed to require cars to make right angle turns help force traffic to slow down before entering. Where garage exits are present, visual contact and awareness between pedestrians and drivers should be supported through mirrors, pavement treatments, and noise signals.
- **Defined shortcuts and convenient crossings increase pedestrian route options and decrease walking distances.** The clean, decorated alleyway (top right) is activated by adjacent land uses to create an inviting pedestrian zone. The signalized mid-block crossing (bottom right) provides a shortcut in the middle of a long block.

WHAT ITEMS SUPPORT A COMFORTABLE AND SAFE WALKING ENVIRONMENT FOR PEOPLE OF ALL AGES AND ABILITIES?

“Universal design” concepts seek to ensure that the transportation network serves people of all abilities, ages, and demographics. Whether a pedestrian is an adult or a child, using a wheelchair or pushing a stroller, or traveling during times of low visibility, streets that work for children, the elderly, and people with special mobility needs serve everyone better.

“There comes a time when people listen to their hearts and feet, getting back to the fundamentals leading to the basic qualities of health, vitality, security and life. All good towns—the towns people are in love with—are based on walkability. Everything else comes second. Everything.”

—Dan Burden



This defined alleyway makes an inviting pedestrian path.



This mid-block crossing provides an opportunity to cross the street in the middle of a long block.

Images from Nelson\Nygaard.

Americans with Disabilities Act (ADA) guidelines and requirements direct appropriate sidewalk and curb cut design and guide ramp placement at curbs and building entrances. Limiting curb cuts, leveling grades, and reducing cross-slopes makes sidewalks safer and more comfortable for all walkway users. Removing obstacles from the sidewalk, including litter, utility poles, or trash cans, creates a clear path of travel for everyone. This also includes regular monitoring and maintenance of cracks and warps. Adopting a more aggressive approach to undergrounding of utilities clears pathways and improves the aesthetic quality of streetscapes.

Special attention should be made to provide publicly accessible lift-assist infrastructure. Ensuring the visibility and consistent placement of signage makes wayfinding systems more navigable and helpful for all people on foot and even drivers. Pedestrians of all abilities need adequate green lengths during signal cycles to allow time to cross. Importantly, when unique paving materials or raised crosswalks are used to provide a visual and tactile signal of the pedestrian environment, care must be given to ensure that any pavement treatments do not hinder movement for those using wheelchairs or canes. Attention to universal design principles throughout the downtown will promote and support pedestrian travel for all segments of the population.

WHAT ARE SAFE ROUTES TO SCHOOL PROGRAMS?

Safe Routes to School programs have been effective nationwide in encouraging children to walk and bike to school. The program is designed to enable and encourage children, including those with disabilities, to walk and bicycle to school; to make bicycling and walking to school a safer and more attractive transportation alternative; and to facilitate the planning,

development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption and air pollution in the vicinity of schools. Safe Routes to School Programs typically consist of:

- **Infrastructure improvements:** including sidewalks, signals, new street connections, etc.
- **Programmatic support:** volunteer and paid programs can be effective in helping children and parents change travel to school behaviors. Some of these programs are described below.

Local jurisdictions could coordinate with the school districts to initiate a number of Safe Routes to School programs that could take on initiatives that have been proven effective elsewhere:

- **Walking school bus:** A walking school bus is a group of children walking to school with one or more adults. Cities could establish a Walking School Bus program that educates parents, schools, and children about the benefits of starting a walking school bus.
- **Bicycle trains:** A bicycle train is a variation on the walking school bus. It consists of groups of students accompanied by adults that walk or bicycle a pre-planned route to school.
- **Bicycle and pedestrian safety education:** Safety education programs are a critical component to Safe Route to School programs and can be conducted on-site at local schools by school staff, volunteers, or parents.
- **Speed watch program:** The program seeks to educate drivers to slow down and exercise caution when using streets near schools. Radar units are used to monitor traffic speeds.
- **Crossing guard program:** Adult school crossing guards play an important role in Safe Routes to School. Cities and neighborhoods could play



A walking school bus is one of the most popular Safe Routes to School Programs. It helps to educate parents, schools and children about walking to school.

Image from Flickr user mobikefed. License info <http://creativecommons.org/licenses/by-nd/2.0/deed.en>

a key role in this program by bringing together community partners, including law enforcement agencies, traffic engineering or planning departments and schools.

- **Traffic complaint hotline:** A traffic complaint hotline could be established, as was done in Phoenix, Arizona, in which police officers monitor complaints and deploy enforcement to problem areas.
- **School crossing audit procedure:** An audit procedure evaluates individual school crossings to identify if any improvements can be made at the crossing and to identify locations where extra attention is needed. The audit procedure normally is conducted by a traffic engineer, a police representative and representatives from the school and school district.



Safety Education: Safety Town Summer Camp, Clinton, Iowa

In Clinton, Iowa, the Safety Town Summer Camp teaches valuable pedestrian safety skills to young children. During two weeks of June, approximately 150 pre-kindergarten children, 4 and 5 year olds, meet for two hours every weekday. During their time spent at the Safety Town, the children learn about traffic rules and safety, how to walk and cross the road as a pedestrian, bicycle, water, and fire safety, stranger danger, and emergency reporting to 911. The Safety Town, which is located at the elementary school's parking lot, is a replica of Clinton and includes miniature versions of downtown businesses, streets, sidewalks, stop signs and traffic lights. The children have the opportunity to learn about safety tips in a playground-like atmosphere.

Image from Iowa Safe Routes to Schools Facebook.
<http://www.iowadot.gov/saferoutes/>

Sources:

Feet First: <http://www.feetfirst.info/>

National Center for Bicycling and Walking (1998). Creating walkable communities: a Guide for local governments. http://www.bikewalk.org/ncbw_pubs.php (accessed December 29, 2007).

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<http://www.wsdot.wa.gov/bike/saferoutesresources.htm>

WalkingInfo.org "Pedestrian Safety Guide and Countermeasure Selection System." <http://www.walkinginfo.org/pedsafe/index.cfm> (accessed December 28, 2007).

BEST PRACTICES BICYCLING

WHAT EVIDENCE IS THERE THAT INVESTING IN CYCLING FACILITIES WILL LEAD TO MORE CYCLING?

From small cities like Corvallis, Oregon to New York City there is an increasing body of evidence that Americans want more and safer bicycling facilities. In almost every case where well planned investments in bicycling infrastructure are made – new demand follows. After spending an average of 15% of its transportation budget on building and maintaining its bicycle infrastructure, cycling in Boulder, Colorado has increased by over 100% in the past ten years. In San Francisco – one of the hilliest cities in the country – Journey-to-Work Data showed an increase of 108% in bicycle trips from 1990 to 2000. Figure 6 shows the relationship between bike commuters and the availability of bicycle lanes in these and other cities.

Figure 6 Mode Split to Bicycle Network Miles

City	% of Arterial Roads With Bike Lanes	% of Commuters Who Bike
Boulder, CO	97%	21%
Davis, CA	95%	17%
Palo Alto, CA	13%	6%
Portland, OR	28%	5%
Madison, WI	About 37%	3%
San Francisco, CA	About 4%	2%
Chicago, IL	11%	1%

Source: Seattle UMP, Section 8

With the addition of the on-street bike lanes, cycling has become more visible to the communities across the country. This increased awareness has led to a growth in the use of these corridors by bicyclists, which shows that the basic presence of bike facilities can help establish the bicycle network and attract cyclists.

In Portland, Oregon, city officials have noted significant increases in cycling for three years in a row. In some Portland neighborhoods bike commuting is as high as 9%. Portland has installed over 260 miles of bicycle lanes, bicycle boulevards, and off-road trails resulting in a bicycle network increase of 24% since 1991. During the same period, the number of bicycle trips across Portland's four bicycle-friendly bridges has increased by 410%; meanwhile corresponding auto counts have remained stable at 0% growth. Here, relatively low-cost investments in cycling infrastructure are saving money by stabilizing auto travel as the population continues to grow rapidly (in fact, per capita vehicle miles traveled have dropped).



Average Daily Bicycle Traffic 4 Main Willamette River Bicycle Bridges

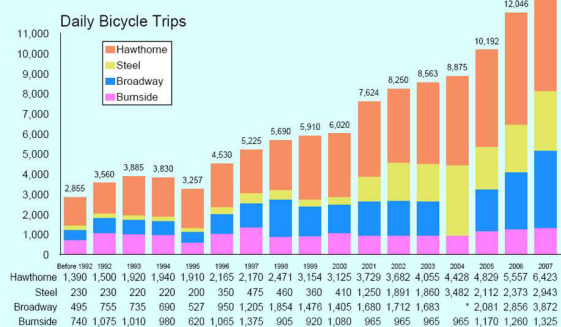


Photo source: NelsonNygaard,

Graphic source: City of Portland, 2007 Bike Counts, p7. <http://www.portlandonline.com/shared/cfm/image.cfm?id=169951>

HOW DO YOU CONVINCE PEOPLE TO CYCLE WITH WINTER COLD AND SUMMER HUMIDITY?

Weather, be it too hot, too cold, too humid or too rainy, is a frequently cited reason people chose not to cycle. However, the problem is often not the lack of willingness to cycle in inclement weather, but the condition people end up in after biking through a rain or snow storm. Developing facilities that allow people to store bikes out of the weather and to shower and change at workplaces can help overcome this barrier.

Provide end-of-trip facilities: A good way to encourage commuting in rainy or humid areas is to provide spaces where cyclists have access to facilities at the end of their commute where they can dry off, store clothes, and shower. Ideally, such facilities will provide secure bike parking, protected from the weather. Using regulations or incentive programs, cities can play a part in encouraging or mandating the inclusion of these resources in all new office buildings.

Rider education and maintenance training: During the winter months, educating cyclists about cold-weather riding can promote bicycling even during the colder months. Providing tips on proper clothing and bicycle accessories will help prepare everyday cyclists for the weather prior to hitting the road. Explaining the benefits of cold-weather riding could encourage continued use of bicycle facilities. For example, cyclists generally warm up as quickly, if not more quickly, than motorists do, while saving the extra time and energy of idling their vehicles.

Bike-transit coordination: Another method of encouraging cycling in less than ideal climates is to allow residents to shorten or alter their journeys by carrying their bikes on all transit modes. Bike-transit integration allows commuters to avoid bad weather or a steep leg of their journey. This requires the in-

Shower and storage facilities can be established for employees of several companies located in close proximity. Examples of this type of arrangement have been organized by Transportation Management Associations in Vancouver, BC and Portland, Oregon. The City of Portland has established a public/private partnership with local fitness centers to provide local area commuters with off-site permanent clothes storage, shower facilities, and secure bike parking. Cyclists can purchase day or monthly passes and access any of the fitness centers. Public/private partnerships reduce the infrastructure investment by the city and allow for a greater geographic network of facilities available to cyclists. Portland's experience indicates that these programs require regular advertising to maintain users.

stallation of front loading bike racks onto buses. Additional outreach could be conducted to ensure that bicyclists are familiar with how to use them.

Roadway maintenance: Municipal policies that prioritize clean up of salt, gravel, twigs and other debris from bicycle lanes are critically important to cyclists as these storm remnants can render bike lanes useless or at least very dangerous.

HOW CAN PEOPLE BE ENCOURAGED TO BICYCLE MORE FREQUENTLY?

Building a strong and lasting bicycling constituency requires a multi-faceted approach that not only provides required infrastructure, but makes cyclists feel they are part of a broad and growing community. Other programs and activities that can engender this community spirit toward cycling include:

- **Encouraging safety practices by conducting a safety campaign:** Cities have limited influence on cyclist and driver behavior at night and in wet weather but some municipal programs have been established to increase awareness and education in this area. The City of Portland and community organizations initiated a public awareness campaign entitled *See & Be Seen: Light the Bike. See the Bike* to bring greater awareness to the dangers of cycling without proper lighting. The campaign is complemented by the local Community Center providing free lights to needy cyclists through its Get Lit! initiative. Other cities have worked to train truck drivers to look out for bikers when they turn right at intersections.
- **Installing adequate bike parking** is a critical component of a bicycle system and infrastructure. National studies show that a lack of adequate bike parking and other related services is a major deterrent to commuting by bike. Bike parking should be located throughout downtowns and at major attractions and destinations.



The City of Portland's "See and Be Seen Campaign" encourages greater awareness of the dangers of limited visibility during winter months.

Source: www.bikeportland.org

To facilitate multi-modal transportation options, bike parking should be conveniently located near transit centers and bus stops. Given climate variability in many communities, sheltered bike parking would provide protection from the heat, snow, and rain. A large supply of available on-street parking in the downtown would make it relatively easy to remove a few stalls for on-street bike corrals such as the one shown below.



In Portland, Oregon, the City has begun to remove on-street parking in strategic locations to provide higher-capacity bicycle parking opportunities that provide good access to local businesses and, in some cases, are located on high-frequency bus stops.

Source: Nelson\Nygaard

- **Celebrating Cycling:** Great cycling communities have numerous events that celebrate those that ride, allow families to ride safely together or to pay homage to dedicated cyclists. Some common events include: organized and supported rides, Sunday Parkways activities where local streets are closed to cars and cyclists are free to ride, bike commute month (or week) where local companies can compete for the highest cycling rates, bicycle carnivals or events that showcase numerous types of cycling. All these events can help to build a cycling culture.

WHAT IS NEEDED TO ENCOURAGE TIMID CYCLISTS TO HIT THE ROAD?

Cities can greatly reduce safety fears by producing better facilities and programs – off-street paths, better crossing treatments, traffic calming, narrowing travel lanes, facility maintenance request programs, and education programs.

Extending the local and regional bike networks will help improve awareness and negative perceptions of safety. Streetscape and road projects should be designed and evaluated against system-wide transportation goals that include specific bicycle objectives and complete streets provisions.

Intersection improvements for cyclists will increase the level of safety because, by far, the largest number of auto-bicycle accidents occur at intersections. Cities can improve both the real and perceived safety of crossing with relatively simple intersection treatments. The inclusion of bicycle detection devices can improve cyclists' experience at an intersection, discouraging red light running, and decreasing delays to bicyclists as well as motorists. The use of bike boxes at intersections, or spaces for cyclists to queue ahead of all vehicles at intersections, decreases the turning conflict which occurs when cars turn right into cyclists' paths.



Intersection enhancements such as this bicycle signal and queuing area improve real and perceived safety conditions for bicyclists.

Source: Nelson\Nygaard

Bike boulevards, or low-traffic streets that have been optimized for use by cyclists, are ideal routes for timid cyclists. Bike boulevards use a variety of traffic calming elements and signage to achieve reduced vehicular speed and presence, which fosters a safe riding environment. Reducing vehicle speeds along bicycle routes by employing affordable traffic calming techniques can both increase safety and reduce the demand for expensive separated facilities.



Bike boulevards use a variety of traffic calming techniques to increase safety.

Source: Nelson\Nygaard

Colored bike lanes are another technique to increase awareness of cyclist movements on the road. Portland, Oregon uses solid blue painted lanes at eleven high-traffic intersections to make the lanes more visible to motorists. In Germany colored lanes are used throughout the city at key spots such as intersections and turn zones where cars need to cross a bike lane. In Belgium all bike lanes are differentiated from the main traffic with the use of color.



Bike boxes allow cyclists to move in front of the travel lane in order to be more visible to cars and avoid turning conflicts. Politicians in Portland, OR are advocating an increase in bike box construction as a safety measure in the wake of cyclists fatalities at intersections.

Source: Nelson\Nygaard



BEST PRACTICES ON-STREET PARKING

ON-STREET PARKING

Curb spaces are a downtown's most valuable parking resource. Not only are these spaces the first preference for most drivers, well-occupied curbs help moderate downtown traffic speeds, create a physical buffer between vehicle traffic and downtown sidewalks, and project a visual cue that people want to be downtown. The relatively fixed supply of such spaces makes effective management of this resource — with direct implications for traffic and congestion management, as well as economic development.

The success of current revitalization efforts will increase pressure on the downtown parking supply — particularly at the curb. Both the value of street spaces and the need to manage their utilization will increase dramatically as more people find themselves travelling downtown more often and staying longer. As this transformation progresses, the six best practices outlined below present means by which cities can capture the full value of their curb space, and create a customer-friendly parking environment that contributes to and benefits from a resurgent downtown.

FOCUS ON AVAILABILITY, NOT SUPPLY

Parking functions as an access tool only when legal, convenient spaces are available. Tracking the number of empty spaces at any given time is therefore the primary measure of how well supplies are meeting demand downtown. The efficacy of the downtown parking supply should be measured based on the consistency of available spaces — a few, but not too many, in all places at all times.

For on-street parking, such a target should be 15%, which means about 1 or 2 empty spaces on each block.



Curb utilization sends an important message to those looking for a space: from “no vacancy” to “welcome” to “nothing to see here”

Source: Nelson\Nygaard

USE PRICE TO MAINTAIN AVAILABILITY

Most places use some combination of meter rates and time limits to manage on-street parking where demand would otherwise exceed supply. Enforcing time-limits, however, is labor-intensive and often ineffective. And metering efforts are often undermined by a common reluctance to price spaces sufficiently high to ensure availability at peak times.

Charging a flexible, market rate, however — one that rises whenever availability is lacking and falls whenever demand is slack — is the most effective and time-honored means for managing demand for any fixed-supply good. Successful application of this approach to curb parking can ensure that spaces are available when they are most needed, without chasing demand away during off-peak hours.

Many cities are providing parking managers with the authority to raise and lower rates by time and location, based on periodic utilization surveys, with the express intent of achieving a 15% availability rate on each block, at all times.



Manage availability via prices that reflect the each space's market appeal.

Source: Nelson\Nygaard

Case Study Redwood City, California

Using variable rate pricing to maintain curb-side parking availability

As of March 2007, Redwood City has been engaged in a demand-responsive pricing strategy to maintain an ideal utilization rate of roughly 85% for their most popular commercial street curb parking. The goal of demand-responsive pricing is to affect behavior. The key to this is communicating the factor intended to shape behavior — meter rates. If parking customers cannot predict how much they will be charged when selecting a location, they will either not come back or just park where they want to and accept the cost blindly. Setting and communicating strategic prices is key to attracting people into areas of lower demand and driving them out of areas of higher demand.

Prior to 2007:

- The street had one-hour time limits but no meters
- The street was 100% full, all day, every day
- After initiating the demand-responsive pricing strategy:
- Pricing is set at \$0.75/hour
- The street has no time limits
- The street's occupancy rate has averaged roughly 82%
- Off-street lot permit sales have increased by 50%
- Parking stays have averaged 72 minutes

Successful test of managing demand:

- Redwood saw the development of a new 2,400 seat downtown movie theater
- No dedicated parking was provided for the theater
- On-street availabilities have remained consistent

Elements of Redwood's management program:

- Current rate is \$0.75/hour
- Occupancy data is collected 4 times a year
- Target occupancy rate of 85%
- Rate change increments of \$0.25/hour
- Rates can change up to 4 times a year
- 3 zones designated based on rough demand levels, reflected in different rates for each zone



Establishing zones according to demand estimates can help to simplify the management and communication of different parking rates.

Source: Nelson\Nygaard

INVEST IN NEW METER TECHNOLOGY

New meter technologies, which are rapidly increasing in popularity, can provide payment flexibility for customers while supporting flexible-pricing strategies to help meet on-street performance-targets. Multi-space meters (pay-by-space and pay-by-number) can help ease the adjustment to market-pricing by providing customers with a wide range of convenient payment options, including credit cards and cell phone payment, that eliminate the need to carry change. This new technology also makes possible a number of pricing strategies that can help maintain availability without raising the base meter rate. While many cities need to build demand before investing in new technology, they should be looking forward to how new technologies can make the customer parking experience more convenient and improve the streetscape in downtown areas.

Multi-space pay stations allow rates to be changed more quickly and affordably, making it more feasible to keep spaces open on Friday night without over-charging on Saturday morning. Second, rates can be set to adjust to the length of parking duration. Where free or short-term parking is a priority, the first hour of parking could be offered for free, or at a much cheaper rate than for subsequent hours. Where commuter parking is the primary barrier to availability, rates beyond a few hours can increase significantly.

ELIMINATE TIME LIMITS

If consistent availability can be maintained through pricing alone, time-limits become unnecessary. Perhaps even more than parking rates, time-limits are a key source of downtown parking anxiety that can counter-productively shorten the time people spend browsing for and consuming local goods and services.

Complement market-pricing with the customer-friendly and business-savvy gesture of eliminating fixed limits on how long anyone can park on-street.

PROVIDE LOW-COST ALTERNATIVES

Off-street facilities provide options that allow customers to choose whether or not to pay for the convenience of on-street parking. As demand for on-street parking grows with the successful revitalization of downtown, it will be important to continue the current laudable practice of maintaining comparatively lower off-street rates.

Off-street spaces are often priced higher compared to on-street spaces because they are more expensive to provide. While this logic is certainly sound, parking management must be based first and foremost on performance — attracting and managing market demand for the products offered. On-street spaces with (relatively) fixed supply levels and markedly



Multi-space pay stations can reduce sidewalk clutter while expanding management options for cities and payment convenience for parkers.

Source: Nelson\Nygaard



Incremental pricing can reduce day long parking without raising rates for shoppers and other short-stay visitors.

Source: Nelson\Nygaard

higher levels of demand should therefore be priced at a premium compared to off-street locations.

Leverage off-street facility resources to provide low-cost alternative to market-rate on-street spaces.

KEEP PARKING REVENUES DOWNTOWN

The revenue generated from parking can be used to directly benefit paying customers by funding conspicuous improvements in downtown streetscapes and open spaces. If the public and downtown businesses can draw a direct connection between the price of parking and improvements that affect them, they are more likely to see the merit in the price being charged. Parking revenues can also be dedicated to improving transportation and parking options, including funding off-street parking options.

Dedicate meter revenues to fund downtown improvements.



Off-Street resources can maintain downtown accessibility for those unwilling or unable to pay on-street rates.

Source: Nelson\Nygaard



Signage on meters can promote a connection between on-street rates and public improvements such as the angled parking, benches, and plantings, which are increasingly more common in main street and downtown areas.

Source: Nelson\Nygaard

Sources:

Interview with Dan Zack (Downtown Development Coordinator, Redwood City, CA) , May 20, 2009.

Image on page 1 from Nelson\Nygaard

Case Study Austin, Texas

Parking Benefit District to return parking revenue to the neighborhood through public improvements

A Parking Benefit District (PBD) is created by metering the on-street parking (either with pay stations on the periphery of the neighborhood or with the traditional parking meters) and dedicating the revenue, less City expenses for maintenance and enforcement, towards improvements in the neighborhood that promote walking, cycling and transit use, such as sidewalks, landscaping, curb ramps, and bicycle lanes.

Preparation for a Parking Benefit District

- Austin began with a substantial outreach effort to educate the public of PBD's and alternatives to the automobile
- Outreach was followed by an application period allowing neighborhoods to compete for the pilot program
- The City, selected neighborhood, and destination businesses:
 - Planned appropriate metering locations, prices, and time limits
 - Identified alternative transportation options and methods of promotion

Parking Benefit District Pilot

- Established along San Antonio Street, between MLK and West 26th Street, an area generally known as “West Campus”
- Coincided with approval of the University Neighborhood Overlay, allowing an increase in residential density in the West Campus area
- Parking revenue dedicated to streetscape improvements, such as improved sidewalks, curb ramps and street trees, to improve the pedestrian environment
- Accessibility, transit, and streetscape improvements made with parking meter revenue is explained to a captive audience by placing informative decals directly on the meters
- Funding for the pilot was provided in part through a grant from the Mobile Source Outreach Assistance program of the Environmental Protection Agency (EPA)

Going forward with a Parking Benefit District Program

- Program has continued beyond the pilot
- Neighborhoods can decide the program is not working and petition to end the program
- Revenue is saved in a Capital Improvement account for each neighborhood
- At the end of the year the neighborhood informs the City how to use the funds



BEST PRACTICES OFF-STREET PARKING

WHAT IS PARKING MANAGEMENT AND WHAT IS ITS ROLE IN DOWNTOWNS?

Downtowns require parking — invariably, more than their on-street capacities can provide. The unique nature of downtowns, however — particularly their constrained land supplies and elevated development costs — makes the over-supply of parking impractical and frequently counter-productive as space absorbed by parking eliminates space that could be put to more productive uses.

Other unwanted consequences of too much downtown parking include:

- Increased points of conflict between cars and pedestrians
- Reduced sidewalk continuity as curb cuts become more common
- More frequent and extended gaps between points of interest
- Decreased pedestrian traffic as visitors spend more time in cars and less time experiencing and exploring downtown on foot
- Financial burden to government to pay debt service on expensive structured off-street parking
- Ties up valuable real estate that could be used for development

The first objective of downtown parking management is therefore to minimize the amount of off-street parking required for downtown to succeed. The best practices outlined below will help cities manage their off-street demand during downtown area resurgence, mitigating the impact of peak conditions and keeping daily supplies lean and efficient even as demand grows.



The trade-offs involved when parking moves off-street are ignored at downtown's peril.

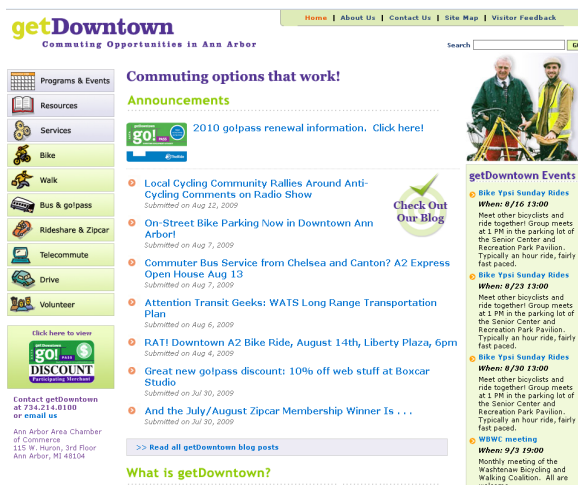
Source: Nelson\Nygaard

WHAT CAN BE DONE TO MINIMIZE OFF-STREET PARKING DEMAND?

While off-street parking will remain a required element of realizing a downtown's vision, minimizing the amount of parking needed will be essential to its big-picture success. If managed well, what exists today could go a long way.

Redefine parking demand as access demand

Assuming that all downtown trips are car trips overestimates the number of parking spaces required to keep downtown attractive. Policies built upon such assumptions undermine investments in other modes of access, which are often more cost effective and require less space. As downtowns become more successful, and demand for development space increases the cost of providing parking, modes such as transit, carpooling, and bicycling will become more competitive with driving and parking.



Awareness of modal options can reduce demand for parking

Source: <http://www.getdowntown.org/>

The first step in reducing the amount of required downtown parking is therefore to see parking as just one part of a multi-modal approach to providing downtown access.

FOCUS ON GETTING PEOPLE (NOT CARS) DOWNTOWN

Promote and support alternative commute options

Providing free or subsidized parking is often the most expensive means of getting workers to jobs. Commute demand often drives parking supply due to its sheer volume and the regularity of its peaks. Commuters, however, are often the population most likely to respond to competitive alternate-mode options, and thus offer tremendous potential for demand-reduction strategies.

Resources that might otherwise fund new parking structures can be used to reduce parking demand by:

- Providing bicycle parking (and showering and locker) facilities
- Supplying free or reduced transit passes
- Establishing a Guaranteed Ride Home program, which reimburses transit commuters for a taxi trip for unexpected trips home that cannot be accommodated by transit
- Providing carpool/ vanpool support through ride-matching services or provision of vehicles
- Providing parking discounts for carpool/ vanpool vehicles
- Implementing zoning regulations that encourage or require alternative-commute benefits
- Marketing information on available driving-alternatives (carpooling, biking, walking, transit)

Increase the downtown residential population

Downtown housing developments are particularly well-suited to capitalize on those looking for alternatives to driving due to the ability to walk or bike to jobs and a wide range of services, retail and entertainment venues. Simply adding housing in downtown, even those with dedicated parking, will increase the amount of trips taken by non-auto modes of transportation. However, specific housing development practices further support active transportation options. These include:

- Minimal or shared on-site car parking
- Un-bundled parking charges so that renters or condo owners have the opportunity to forego purchasing a parking spot, thereby reducing their housing costs
- Convenient on-site bicycle parking
- Building design that emphasizes connections to downtown area pedestrian, bicycle, and transit networks
- Car-sharing resources (membership, on-site access, marketing) and parking

Encourage visitors to use transit, walk, and bicycle

Cities should encourage their visitors to get out of their cars and experience the city through riding transit, walking, and biking. Approaches for promoting a variety of travel modes among visitors include:

- Convenient and customer service-oriented web-based travel information, including transit service information (fare, schedule, hours of service, route map) and bike maps and rental information is important for attracting new riders.
- Real-time transit information can be provided over the internet, cell phones, and at bus stops

Case Study

Ann Arbor Michigan – getDowntown Program

Reducing off-street parking demand through expanded access

Introduction

In order to address growing concerns about traffic and congestion problems in downtown Ann Arbor, a number of public and private entities joined together to initiate the getDowntown program to serve as a centralized commuter information clearinghouse providing guidance and assistance to downtown businesses and employees on commuting options, such as biking, riding the bus, walking, and carpooling.

Mission

The mission of the getDowntown Program is to reduce the number of downtown commuters driving to work alone and to create more transportation choices for downtown commuters through promoting existing transportation options and advocating for new ones. In reducing the number of people driving to work alone, this program reduces the demand pressure on the downtown parking supply.

Funding

The getDowntown Program is funded through a Federal Congestion Mitigation and Air Quality Grant (CMAQ), provided by the Ann Arbor Transportation Authority (AATA). In addition, the Ann Arbor Downtown Development Authority (DDA) provides funding for go!passes and additional staffing. The City of Ann Arbor also contributes funding to the getDowntown Program. Finally, the Ann Arbor Area Chamber of Commerce houses the getDowntown Program, and provides important in-kind donations such as space, accounting services, and much more.

Program Features

getDowntown provides information and resources to reduce the number of individual drivers coming into downtown. By expanding access to downtown through modes other than the single occupancy ve-

hicle, taken together, these program elements reduce the demand for off-street parking in downtown Ann Arbor. These include:

- Personalized trip planning assistance to commuters
- Promotional materials on bicycling, walking, carpooling, and taking transit to work
- Running The Commuter Challenge, an annual month long competition encouraging individuals to use sustainable transportation with 139 competing organizations involving nearly 1,800 individuals in 2008
- Managing 31 Cycle Safe downtown bike lockers
- Information on ridesharing to match people for carpools/vanpools
- Preferential parking for carpools or vanpools of 3 or more people
- Attracting ZipCar to offer vehicles in Ann Arbor
- go!pass - an unlimited usage bus pass, free of charge, available to all downtown employees
 - First two-years go!pass was funded through a Federal Congestion Mitigation and Air Quality Grant (CMAQ) grant
 - go!pass program was continued beyond 2001 with funding by the Downtown Development Authority generated by parking revenues

Summary

Promotion of alternative transportation options is a very effective way of reducing the number of individuals driving to work alone. In shifting commuters to modes of travel other than driving alone, a transportation resources center will help reduce the number of spaces that was previously needed to accommodate daytime demand.

and allows potential riders to choose how long to wait for a bus.

- Bus stops and shelters should have a range of travel information, including prominent display of route number, neighborhood destinations, bus schedules, and system route map. Amenities should also make passengers feel comfortable and safe and include shelters, benches, and lighting.
- Wayfinding signs are important for guiding visitors to downtown attractions and encourage walking trips.
- Print-materials promoting key service routes at common visitor destinations, including parking facilities
- Increase the number of quality pedestrian and bicycle connections to downtown

REDUCE THE NUMBER OF SPACES EACH CAR USES WHILE DOWNTOWN

Create a Park-Once District

Convert drivers to pedestrians when they enter downtown. By providing convenient, attractive, and well-signed public parking options, the benefits of a successful park-once strategy will be shared among all downtown businesses and stakeholders, and include:

- Making parking more customer-friendly (fewer “...Towed at Owner’s Expense...” signs).
- Giving cities the control to place parking where it can be most beneficial — close to where people want to be, but designed and organized to keep sidewalk disruptions off primary commercial streets.
- Keeping sidewalks busy by allowing visitors to leave their car behind and see more of the area’s pleasures and pursuits on foot.

Most importantly, a Park-Once District reduces the number of parking spaces required to support a thriving downtown. A trip that includes a restaurant, a museum, and a park requires one space instead of three.

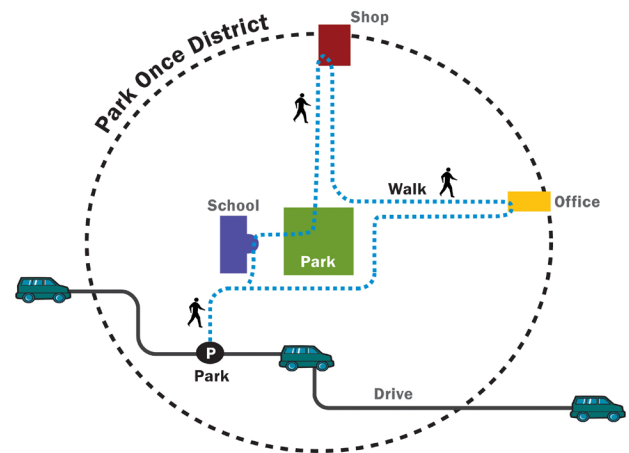
There are two keys to making this strategy work:

- Making downtown walking as attractive, rewarding, and safe as possible
- Shifting off-street parking from isolated, reserved, accessory lots to inviting, shared, public facilities

Emphasize Shared Supplies

Cities can play an important role in developing a Park-Once environment by shifting parking toward shared, public parking facilities and away from less-efficient, private locations that require visitors to move their car between each destination.

The “Park Once” District



Based on an original illustration by Walter Kulash.

In the Park-Once District, drivers become pedestrians and experience more of downtown the way it was meant to be experienced.

Source: Nelson\Nygaard

To shift future parking supplies away from reserved parking, a city can use zoning and economic development strategies to minimize accessory parking at new development. Strategies that build upon this success include:

- **Parking maximums** that limit rather than require off-street parking
- **In lieu fees** that allow developers to pay into a fund rather than building parking. Funds can then be used for public supplies or other transportation investments instead of less-efficient private parking facilities
- **Off-site strategies** that can provide access to public ramp spaces in lieu of on-site parking required by financial institutions

The City can also encourage shared-parking among existing uses with off-setting demand peaks (think Bank and Movie Theater). Strategies that local jurisdictions can help develop include:

- **Providing or identifying a Shared Parking Broker** to match parties interested in providing available spaces and parties interested in accessing them
- **Supporting effective valet parking operations** that access under-utilized facilities while providing visitors with “front door” parking
- **Establishing a public valet service**, particularly during major downtown events

EXPAND EXISTING CAPACITY

There are a number of strategies that are particularly effective in a downtown setting that can expand the “effective supply” available to downtown parkers. These strategies can be particularly effective in managing the extreme demand peaks created by special events. These include:

- **Parking shuttles:** Creating convenient transit links between remote parking and the downtown core or event sites can expand parking options for price-sensitive customers and make use of less convenient parking resources
- **Valet parking:** Outsourcing the trip to remote lots and garages to valet attendants provides customers with “front-door” parking spots, while putting the under-utilized facilities to good use

DON'T LET SUPPLY RUN AHEAD OF DEMAND

Keep the public supply lean

As demand grows, invest in access, not necessarily parking.

- **Step 1** – Seek the most economical means of accommodating demand for downtown access (including transit improvements, commuter benefits, expanded bicycle and pedestrian networks, as well as parking)
- **Step 2** – Use pricing to maintain on-street availability (higher rates when and where availability is constrained – see Downtown Parking Management)
- **Step 3** – Use pricing to maintain off-street availability until constructing new parking supply becomes the most viable option in Step 1

Communities should evaluate and employ strategies in all three areas before considering construction of expensive off-street parking construction.

Encourage private efficiencies

As revitalization efforts gain traction, reining in developer tendencies to over-supply their projects will be critical to reinforcing downtown’s urban vitality, and maximizing the amount of developable space that is put to higher and better uses.

WHAT ELSE CAN PARKING MANAGEMENT DO?

Design

Once off-street parking demand has been streamlined, the top priority of off-street management is to ensure that facilities support, rather than hinder, the visual and functional qualities critical to downtown’s historic appeal. Zoning requirements and/or design guidelines should be implemented to ensure that off-street facilities:

- Minimize curb-cuts and keep them off key pedestrian, bicycle, and transit corridors



Redundant, under-utilized inventories represent a missed opportunity.

Source: Nelson\Nygaard

- Keep sidewalks active with, sidewalk-oriented, ground floor uses
- Provide secure bicycle parking on-site
- Provide clear pedestrian access routes through the facility — particularly when the facility can provide a mid-block cut-through such as at the River Center ramp

Revenue Issues

The high construction costs for structured parking present a number of management dilemmas for those charged with constructing and maintaining facilities. It is important, however, that once off-street resources are built — whether in the form of low-cost lots or high-investment ramps — rates are set based on demand and availability, not on the facility’s cost burden. Market-priced parking creates a win-win or lose-lose dilemma for revenue managers — vibrant downtowns can turn profits on parking, while struggling districts cannot charge enough to pay for simple upkeep and/ or debt-service on what they have — making it difficult for struggling cities to resist charging too much for parking.

This makes it critical for cities to establish a revenue policy for its parking prior to any new facility construction. For most cities, this means choosing between the following two options:

- **Policy 1** - *Parking must pay for itself. Under such a policy, a city would not invest in new parking construction unless and until demand was sufficient for the facility's income to cover its construction and maintenance costs.*
- **Policy 2** - *Parking is an economic development resource that is worth subsidizing. Under such a policy, a city must be prepared to make up the difference between what a new garage costs to build and maintain, and the revenue it will generate.*

Under either scenario, new facilities will be paid off most effectively through a big-picture focus on revitalizing downtown, an important part of which is basing parking rates directly upon demand.

Sources:

Ann Arbor: <http://www.getdowntown.org/>

Image on page 1 from Nelson\Nygaard



Parking supply alone is not enough: ensure that facility design reflects and supports urban surroundings.

Source: Nelson\Nygaard



BEST PRACTICES TRANSIT

WHAT CAN BE DONE TO PROMOTE TRANSIT?

Citizens have a broad range of interests and needs when it comes to transit service, but were we to attempt to summarize the desires we most commonly hear from transit user and non-user opinion research into a brief statement, the common request might read:

A set of services that allows me to conveniently complete most of my daily activities without owning a car, or allows my household to save money by getting by with one less car, comfortable access to the system, and a high level of security at the stop and on-board.

This section explores “best practices” that help move communities toward this customer vision, which ultimately supports higher-level city goals related to reducing harmful emissions, mitigating traffic congestion and creating more vibrant neighborhoods.

WHAT CAN BE EXPECTED OF A GREAT TRANSIT SYSTEM?

Research has shown that the factors most affecting transit ridership, like density of population and employment, parking supply and cost, degree of urban congestion, availability of roadway capacity, and cost of owning and operating a private auto, are beyond the control of transit operators themselves. Transit providers must coordinate with those responsible for street operations, which impact transit speed and reliability, and sidewalks and pedestrian facilities, which are critical for passengers to access transit. Successful transit systems are defined by high ridership, safe and reliable operations, and influence on the development of vital economically successful neighborhoods. A good measure of a successful system, regardless of the size of the city, is when local residents opt to live without a car or to live with one less car.

Below are some examples of service features and transit programs that have worked in other places.

Improve Frequency and Reliability of Transit Service

Convenience is a major deciding factor for many people when choosing a mode of travel. If transit operates at a high enough frequency with enough capacity, people are more likely to choose transit over an automobile.

- Service frequency that does not require a customer to carry a schedule (at least every 15 minutes)
- Reasonably wide spacing between bus stops to increase operating speeds (passengers don't feel like the bus is stopping every block)
- Prepaid tickets and boarding passes to expedite passenger boarding (also eases the fear of “what do I do with the fare box?”)



Wait time has two to three times more impact on transit decision than the actual travel time.

Image from NelsonNygaard.

- Low-floor buses with wide doorways to speed boarding and alighting
- Transit priority in mixed traffic (e.g., bus lanes and special signalization)

Improve Comfort, Safety, and Convenience of Service

For transit to make substantial gains, it must be seen as a positive choice compared to driving. This requires both improving transit options and removing incentives to drive. Specific improvements that enhance comfort, sense of safety and convenience include:

- Door to door travel time that is competitive with driving
- Transit vehicles that are not consistently over-crowded
- Expanded service available through a larger portion of the day
- Convenient transfers between modes and routes
- Amenities at transit stops and stations, shelter, seating, lighting, information, bike parking
- Clean vehicles – new customers expect buses to pass the white glove test
- Knowledgeable drivers – often the first person a new transit customer will turn to for confirmation that they are doing the right thing
- Convenient ticket purchasing locations
- Sidewalks leading to stations and secure, lighted waiting areas
- Uniform and simplified fare structures across area transit modes and providers
- Discounted transit passes tailored to individual rider needs
- Widespread publication of schedules and color-coded matching of buses and lines
- Simplified information to make systems more “tactile” to riders

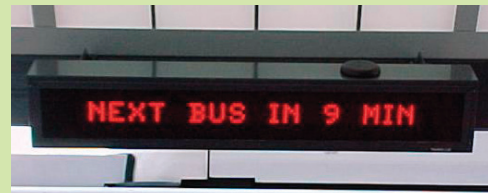
- Special taxi service options to extend and complete the transit network
- Real time information for customers, at stops, on the web, on personal communications devices
- In many small agencies, those areas where the greatest improvement is required are also the most expensive and deficiencies are due to budget constraints, not intent or commitment to service. Ultimately, the most important improvements to transit will require new funding sources. U.S. transit funding systems put the burden for raising operating funds on local communities, meaning longer service hours and more frequent service will require an increased financial commitment by local citizens and businesses.

WHAT RESPONSIBILITY DO OTHER AGENCIES AND GOVERNMENT HAVE IN MAKING TRANSIT MORE EFFECTIVE?

Forces external to transit play a much larger role in determining the success of the system than the transit agency. Some common external influences that impact the success of local transit systems include:

Making Transit Competitive with Private Automobiles

- High automobile and motor fuel taxes
- High parking taxes
- Parking limits and pricing in city centers and uniform policies throughout the city center
- Street designs that de-emphasize auto access in some downtown environments, such as popular downtown retail districts
- Discounted automobile rentals and car cooperatives sponsored by transit agencies
- Making communities walkable or pedestrian friendly makes them transit friendly
- Pedestrian- and transit-compatible urban land use policies



Real time passenger information displays at bus stops and transfer centers provide passengers with reassurance on the time they will have to wait for their bus.

Image from U.S. Dept. of Transportation.

- Land use decision making shared among local, regional, and national governments
- Regional integration of transportation and land use plans and zoning
- Common rules and guidance on street and site development designs favorable to transit

WHAT ABOUT MARKETING?

The environment, or context, in which transit operates plays a significant role in determining success. Transit systems need to know the market, tailor services and features to that market, and communicate as directly as possible with that market. Lessons learned in marketing:

- A single ad campaign will produce no lasting bump in market share or sales
- Continuous messaging to the desired specific market is a necessity to gain, or even maintain, market share

No market is static, what worked last year may provide no success this period.

MAKING TRANSIT COMPETITIVE IN THE

MARKET PLACE? Most auto manufacturers spend significant portions of gross revenue in marketing research and media. Transit agencies seldom spend more than 10% of gross revenues on marketing, and marketing is nearly always first to fall when budgets get tight.

ARE ALL SERVICES CREATED EQUALLY?

In any transit system certain bus lines will serve a disproportionately large number of passengers; typically these are the routes that provide the highest level of service and travel through the most developed corridors. These routes are designed to carry the heaviest passenger loads at the greatest level of convenience. This convenience can and should be marketed.

Many systems have dramatically increased transit ridership by providing these types of services with a different “look and feel” than the rest of the system. While the buses may or may not be the same, many physical features of the bus stop can also help make these primary routes stand out and advertise its exceptional usefulness. These can include:

- Distinctive design for primary transit network shelters, including fully enclosed shelters with heating and air conditioning where demand warrants. Signs on shelters identifying their location can also help passengers to orient themselves, and give the shelters more of a “station-like” feel.

- Amenities at or near shelters that give value to waiting time, including phones, newsracks, and other fast vending opportunities.
- Distinctive signage, providing much more information than the current generic bus stop and advertising “15-minute service” or “the bus will be here soon!”
- Distinctive look for schedule information on high-frequency lines.
- A new approach to the system map, using colors to emphasize frequency. Most transit maps make no effort to distinguish intense services from infrequent ones. The resulting map is analogous to a road map that doesn’t distinguish between a freeway and a dirt road.



Ridership Growth Success Stories

Whatcom Transportation Authority (WTA) in the State of Washington experienced record ridership growth with the introduction of their high-frequency Go Line service. According to the FTA, ridership on WTA grew faster than any other major U.S. city between 2007 and 2008, when it grew more than 20%. In 2008, it increased by 32%. Ridership growth can in part be attributed to service restructuring when the agency dramatically increased the number of service hours and launched the once-every-15 minutes GO Lines to entice people who could otherwise drive.

Transit service in **Boulder, Colorado** has also experienced dramatic ridership growth. In 1989, Boulder began implementing a Community Transit Network using small, colorfully designed buses to provide high frequency, inexpensive and direct local service. Between 1989 and 2002, local and regional transit ridership increased by 500%. Today, there are six bus routes – HOP, SKIP, JUMP, BOUND, DASH and STAMPEDE – with unique identities shaped with community input.

Some of this ridership growth in Boulder can also be attributed to the Eco Pass program, which allows employers to purchase an annual bus pass for full-time employees. The Central Area General Improvement District in downtown Boulder provides fully subsidized Eco-Passes to more than 8,300 employees, employed by 1,200 different businesses in downtown.

Source: <http://www.bellinghamherald.com/255/v-print/story/524293.html>

Images from Victoria Transportation Policy Institute and Whatcom Transportation Authority

Sources:

Krizek, K. A, El-Geneidy, 2007, Segmenting Preferences and Habits of Transit users and Non-users, Journal of Public Transportation, Vol.10, No. 3

Making Transit Work: Insight from Western Europe, Canada, and the United States – Special Report 257 (2001), Transportation Research Board

CASE STUDY

Community Transit Swift BRT

In November 2009, Community Transit (CT) began operating Swift Bus Rapid Transit (BRT) along the Highway 99 corridor. Located only 11 miles from downtown Seattle, Swift offers regional high capacity transit connecting the cities of Everett and Shoreline. The new BRT also links Snohomish County with King County Metro's regional transit service, providing a more efficient transit connection into downtown Seattle. This case study offers a detailed look into how a growing automobile-oriented suburban corridor became the setting for suburban BRT—as well as the elements needed to ensure success.

Previous local bus service exhibited high ridership—12,300 boardings between 3 transit providers on 4 routes. BRT was seen as a potential way to add capacity for transit's growing demand along the corridor. Local route ridership was projected to increase to 15,100 by 2015 and 20,300 by 2030. Although CT Route 100 and 101 combined to offer 15 minute peak service frequency, BRT presented a strategic opportunity to make service more frequent, attractive and reliable, even during peak periods.

During the planning phases of the BRT, Swift was projected to see 13,500 daily riders by 2015 and 21,300 daily riders by 2030 (excluding local service ridership). Furthermore, 7,300 new daily riders were projected to use BRT by 2015.¹

According to Community Transit, current ridership has well-exceeded initial projections, carrying 2,660 riders per day. Swift is currently CT's highest ridership route amidst an 8% system-wide drop in ridership from 2009 levels.² Because CT only began operating Swift BRT in November of 2009, no ridership demographics or rider survey response are available. CT is in the process of developing a post-implementation survey in the beginning of 2011 to address the changing needs of Swift's users.

Swift covers a 16.7-mile route and stops at 15 stations along its course. It runs entirely within mixed traffic, although 7 miles of the corridor contain curb separated Business Access and Transit (BAT) lanes that force non-transit vehicles to turn right at intersections. This is much different from other systems such as Los Angeles' Metro Orange Line and Eugene's EmX Green Line³ that provide dedicated right-



Location: Snohomish County, Washington

Length: 16.7 miles

Route: South from Everett Station along the Highway 99 corridor to Aurora Village Transit Center in Shoreline

Cost: \$28.4 million

Ridership: 2,660 per day (Feb. 2010); Projected to see 13,500 daily riders by 2015 and 21,300 daily riders by 2030

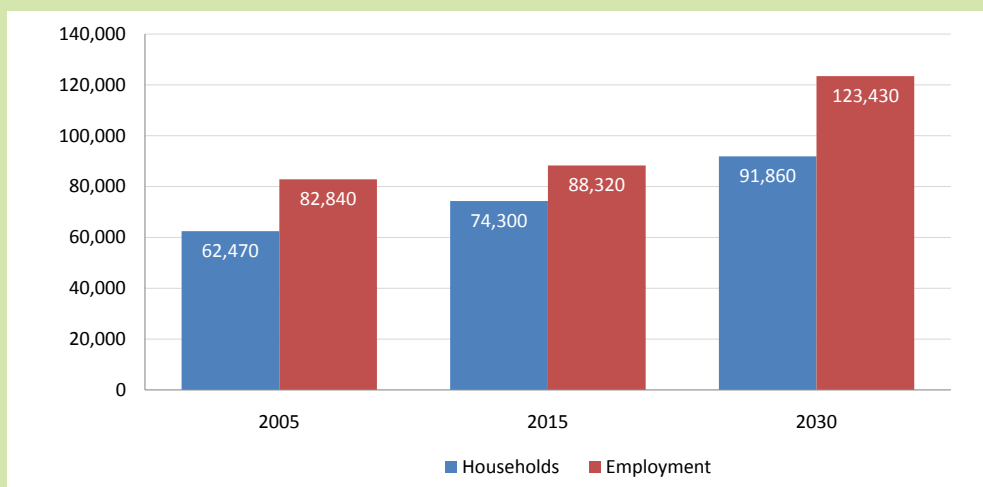
Source: Community Transit

of-ways for BRT vehicles. An important characteristic of the line is that it acts as a service overlay on top of existing local fixed route service. In other words, Swift supplements existing local routes by providing longer stop spacing for increased travel speeds and frequencies.

Why BRT for Highway 99?

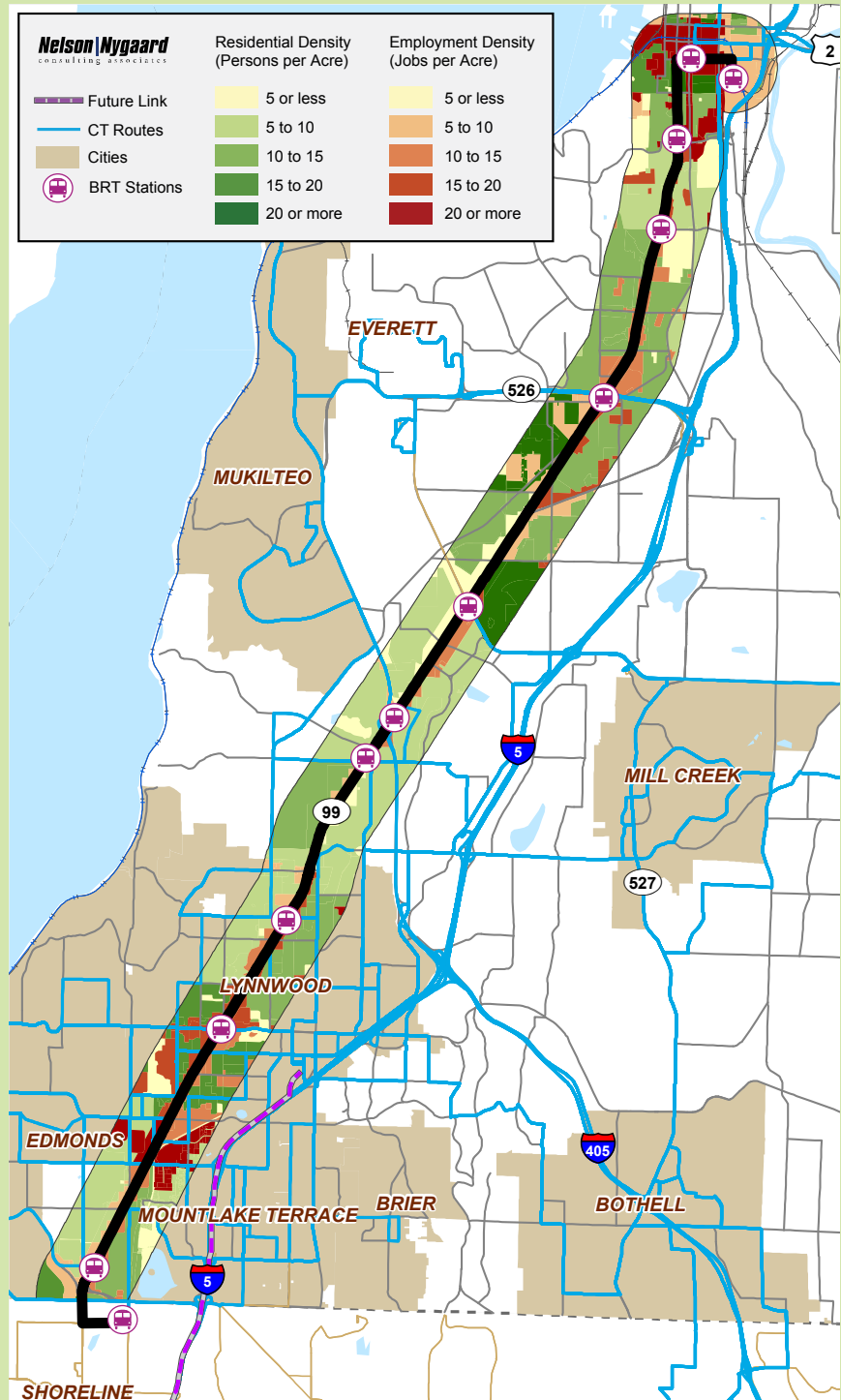
A variety of contributing factors led to the implementation of high capacity transit along the Highway 99 corridor. Highway 99 combines an existing well-developed transit market, high transit productivity, high residential and employment densities at various nodes along the corridor, relatively mixed uses, connectivity with designated Regional Growth Centers (especially Everett and Lynnwood), and an existing pattern of transit only/BAT lane facilities supportive of higher transit speeds and reliability. Figure 8 (following page) displays population and employment densities per acre along the corridor, while Figure 7 (below) indicates the level of corridor population and employment growth projected to occur between 2005 and 2030. These projections help to designate this corridor as a regional activity center in the near future.

Figure 7 Projected Population and Employment along Hwy 99 Corridor



Source: SR 99 BRT Planning Study (2004)

Figure 8 Population and Employment Density per Acre along Hwy 99 Corridor



What are the major elements of Swift BRT?

Service Characteristics

Swift operates along a 16.7 mile segment of Highway 99 between Everett Station, at its northern terminus, and Aurora Village Transit Center, at its southern terminus in Shoreline. It offers 19-hour weekday service between 5 AM and midnight and 18-hour weekend service between 6 AM and midnight. This represents the corridor's demand for evening service to local retail and residential areas.

Swift offers weekday service frequencies of 10 minutes between 5 AM and 7 PM and 15 to 20 minutes between 7 PM and midnight. Weekend service sees frequencies of 20 minutes between 6 AM and midnight.⁴ Station locations, established roughly 1-mile from each other, were chosen based on a variety of conditions, including:

- Historic boarding activity
- Local transit connections
- Relationship to employment/activity centers
- Intersection infrastructure (i.e. signalization, transit signal priority, BAT lanes, etc)

Stop spacing likely helps to reinforce consistently low headways. Local route service is overlaid in order to allow for local, short-distance trips.

Travel Time Improvements

BRT service provided significant improvements in travel speed and time from a variety of strategies. When CT implemented BRT along Highway 99, the existing route structure was adjusted to compliment BRT and improve service efficiency. CT eliminated Route 100 and while cutting back Route 101's frequencies to 20 minutes.⁵ Nineteen of CT's local bus routes now feed into BRT station areas for potential transfers. Other downtown Everett-Everett Station circulators were re-routed to solely serve areas adjacent to Everett Station. This action mitigated bus congestion along Pacific Avenue improving BRT travel speeds.

Other time improvements are derived from limited stops, multiple door and level boarding, passive ADA restraint, efficient off-board fare collection procedures and technology, transit priority signals, and transit only lanes. Traveling the corridor by the previous local bus service took 73 minutes, while the Swift line cuts travel time by 30 percent, only taking 51 minutes.⁶

Vehicle Specifications and Capacity

Swift BRT runs on New Flyer 62-foot articulated hybrid diesel-electric buses that seat 43 passengers and carry up to 80 riders. This is a significant upgrade from local bus vehicles that typically only hold 40 passengers. In order to improve boarding efficiency, Swift vehicles allow for boarding at 3 different doors. The improvements upon local bus service significantly improve travel time and capacity. The vehicle's interior is designed for maximum seating comfort with wide padded seats, while maintaining ample standing room for those with shorter trips. Other amenities include on-board bicycle racks that carry up to 3 bicycles per vehicle and user-activated wheelchair ramp boarding. These enhancements drastically improve the experience for users and tend to attract new transit users when combined with high speed service.

Station Design

All Swift BRT stations consist of a uniform design. However, many jurisdictions are planning district concepts that will communicate a unique character for each station. Examples of district concepts include an "entertainment" district, a high-density "residential" district, and an "automobile-retail" district.⁷

In addition, all stations provide greater passenger amenities than a standard bus shelter. Most stations include raised platforms that facilitate level boarding for passengers. Comfort is enhanced with benches, windscreens, and shelter that protect passengers from harsh weather. Users feel safe with nighttime lighting, safety railing, and random transit police patrols. In addition, information kiosks and bus arrival displays notify passengers of transit system schedules and next arriving buses, respectively.⁸



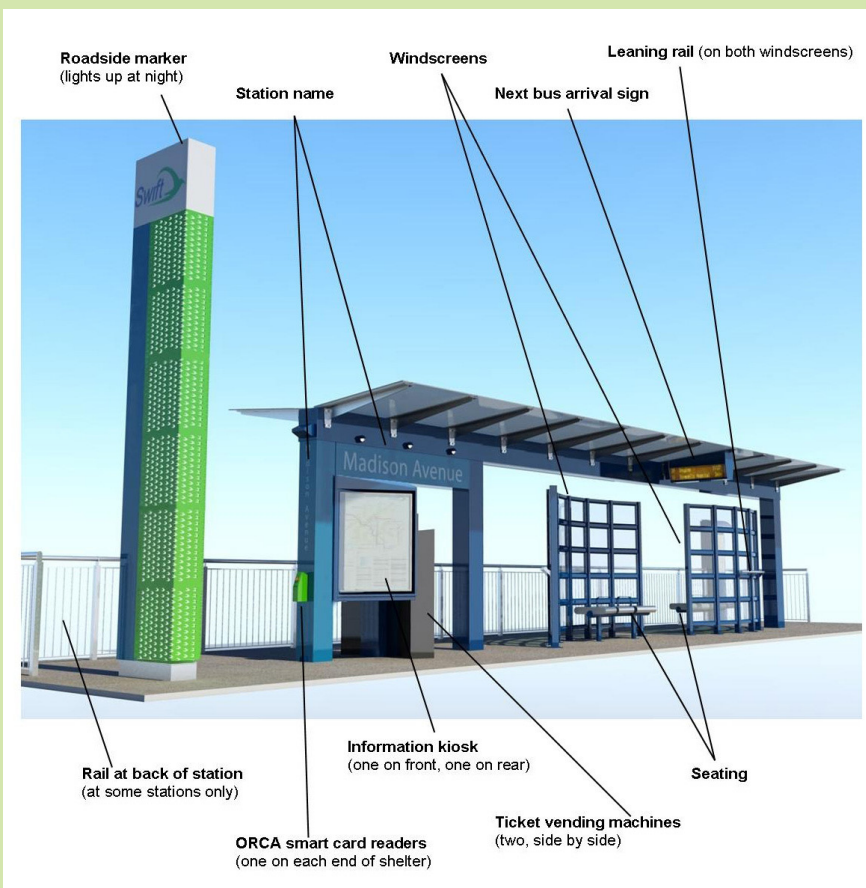
Source: Community Transit

Intelligent Transportation Systems

A critical component to decreasing travel time in a mixed traffic running way is employing intelligent transportation systems (ITS). The southern portion of the route is equipped with transit signal priority treatments where transit vehicles are given extended green lights for late running buses. TSP will expand to the remainder of the route by the end of 2010.

In addition, transit vehicles are furnished with technology that informs passenger information displays at BRT stations of real-time bus arrival estimates. This increases user confidence and allows for passengers to ride Swift without a transit schedule.

Although Swift is not furnished with docking technology, CT installed plastic curb bumpers on station raised platforms to ease driver anxiety from curb damage. This cost effective treatment will better achieve the preferred 2 - 4 inch docking tolerance.⁹



Source: Community Transit

Fare Collection

Swift BRT provides several off-board methods to collect transit fares. On-board ORCA smart card readers and station ticket vending machines eliminate the need for on-vehicle fare collection. By paying fares prior to boarding, boarding efficiency and travel speeds are drastically improved. Passengers can also use regional transit passes (i.e. PugetPass, EdPass, U-Pass or FlexPass). "Ambassadors" provide periodic fare inspections on-board.

Branding BRT

Marketing Swift BRT is achieved through vehicle branding, a distinct Swift logo and station identification. BRT vehicles incorporate sleek designs depicting a stylized swift bird. In addition, BRT stations are equipped with roadside markers and attractive shelters that clearly identify stop locations. The permanence of each stop is an attractive feature that assures passengers that the bus will always stop there.

How much does Swift cost and how was it funded?

The project's total capital infrastructure costs amounted to \$28.4 million. This cost includes approximately \$13.6 million for BRT vehicles, \$1 million for off-board fare collection technology, and \$13.8 million for station construction. CT projects that Swift's annual operation will cost \$5 million.

Finding funding sources was a critical component of Swift's implementation. The largest source for funding new transit capital investment comes from the FTA New Starts Program. The Swift BRT project was not given New Starts funding likely because it would not operate on a separated right-of-way. \$11,255,110 of federal funding was used to purchase vehicles. Outside of federal sources, the project utilized a mix of state Regional Mobility funds, and local revenue streams. Partnership funds between Community Transit and Everett Transit—the city of Everett's transit provider—made up the remainder of the project's funding. Initial operating costs are divided up by federal JARC grant funds, a state regional mobility grant, and partnership funding.¹³ Partnership funding will likely sustain future BRT operation along the corridor.

How is land use responding to BRT?

One of the key criteria for choosing BRT for this corridor is its current land use environment. Moving from north to south, the first quarter of the corridor generally exhibits central business district land uses in Everett, and residential and medical uses down to 41st Avenue. The remaining three-quarters of the corridor are characterized by strip commercial development.

Several cities are actively conducting land use studies in order to accept more density along the Highway 99 corridor. The general objective for updating development code and design guidelines is to create TOD nodes that support higher densities and better accommodate pedestrian movement.

Although some communities are changing land use in response to BRT, others are only responding to broader policy enforcement. Two prime examples are featured in the cities of Everett and Lynnwood. The city of Everett, an urban anchor for Swift, developed a Downtown Plan in 2006, seeking to capitalize on its potential to become a dense metropolitan center served by efficient multi-modal transportation.¹⁰ The Downtown Plan calls for large increases in residential and commercial development along Rucker Avenue and Pacific Avenue along the BRT route.

Although Everett's land use changes will certainly better serve BRT, this process was a threefold response to the downtown community's desire for economic growth, the regional growth vision, entitled Vision 2040, and regional population and housing allocation rules from Washington's growth management policy. This was not a direct response to the transit-oriented development potential stemming from BRT.

On the other hand, the City of Lynnwood, at the southern end of the Swift BRT corridor, independently initiated a land use planning effort around BRT calling for transit-oriented "Gathering Places".

The corridor's existing land use environment consists of commercial strip malls, car dealerships, and other various automobile-oriented uses. To enhance the land use connection to BRT, the city initially adopted economic development strategies for the Highway 99 corridor and amended

them into its comprehensive plan in February 2008—prior to Swift's completion.¹¹ Some of the key land use and transportation objectives identified during this planning process included:

- Increasing density and introducing mixed uses in conjunction with BRT
- Concentrating housing within walking distance to BRT stations
- Co-locating housing and commercial uses
- Enhancing pedestrian access to BRT
- Encouraging a variety of local businesses to locate along the corridor

The corridor then underwent a public process for a sub-area plan as the community weighed in on several development scenarios. This process produced the "Necklace Concept" (Figure 9 on the following page) consisting of primary and secondary nodes oriented around BRT that accept greater density and land use mixing.¹² In all, Lynnwood conducted a fairly quick and painless planning process in only two years yielding future land use changes that complement BRT.



196th Street SW station area along Highway 99 in Lynnwood.

Source: City of Lynnwood

Figure 11 Future Development Concept for the Highway 99 Corridor in the City of Lynnwood



Source: City of Lynnwood

Sources

- 1 SR 99 BRT Planning Study, Mirai Associates, 2004
- 2 interview with Community Transit Project Manager. Ridership levels are as of February 2009.
- 3 Roughly 60% of the Green Line operates on a dedicated median right-of-way. The remainder is a mixed traffic right-of-way with transit only lanes and intersection queue jumps.
- 4 Community Transit, <http://www.commtrans.org/Projects/Swift.cfm>
- 5 Recent service cuts have forced Community Transit to decrease Route 101 service frequency to 30 minutes, effective June 2010.
- 6 Community Transit Transit Development Plan 2008-2013
- 7 interview with Community Transit Project Manager
- 8 Community Transit, <http://www.commtrans.org/Projects/Swift.cfm>
- 9 interview with Community Transit Project Manager
- 10 City of Everett Downtown Plan, July 2006, http://www.everettwa.org/pdf/econdev/DowntownPlan_adopted.pdf
- 11 City of Lynnwood Highway 99 Corridor Study Adopted Strategies, 2008
- 12 City of Lynnwood Project Highway 99 Preferred Alternative Presentation, June 2009
- 13 interview with Community Transit Project Manager