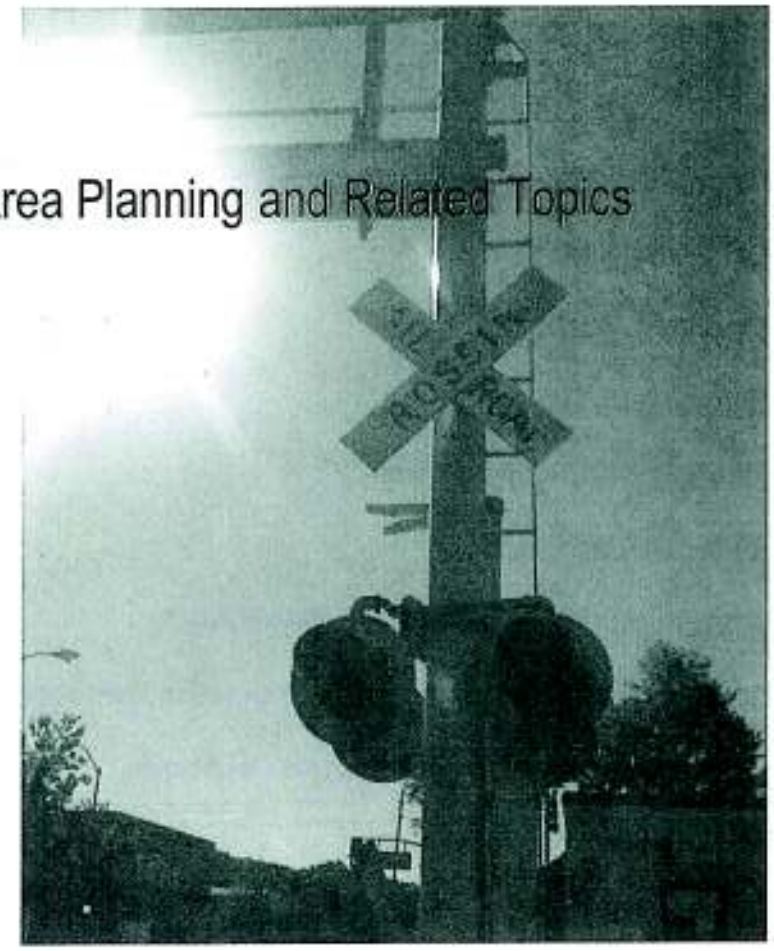
A Reader: Station Area Planning and Related Topics



City of San Rafael
Community Development Department
September 2010

This reader was prepared for the Redevelopment Agency Citizens and Civic Center Station Area Plan Advisory Committees, and includes excerpts about station area planning topics from different sources. The reader includes articles about housing, transportation, parking, and a variety of other related issues. The recommendations in these writings should not be interpreted as directions for the advisory committees. Instead, the purpose of the reader is to provide an overview of recent planning activities and approaches, and to stimulate discussion and serve as a reference document.

Table of Contents

Additional online resources

Station Area Planning Manual (Metropolitan Transportation Commission)
http://www.bayareavision.org/pdaapplication/Station_Area_Planning_Manual_Nov07.pdf

Reforming Parking Policies to Support Smart Growth (Metropolitan Transportation Commission)
http://www.mtc.ca.gov/planning/smart_growth/parking_seminar/Toolbox-Handbook.pdf

San Rafael Station Area Plans
www.cityofsanrafael.org/stationareaplans

San Francisco Planning + Urban Research Association
a member-supported nonprofit organization

SPUR IDEAS AND ACTION FOR A BETTER CITY

ARTICLE
This is article appears in the January 2010 Urbanist

Thriving TOD

What can we learn from mass transit in D.C. suburbs?

When BART opened in 1974, many suburban Bay Area communities "downzoned" the areas directly adjacent to the station. When the D.C. Metrorail system opened in 1976, transit planners for Washington Metrorail as well as Arlington County, Virginia, and Montgomery County, Maryland, took a different approach. The Washington Metropolitan Area Transit Authority and local jurisdictions actively pursued development opportunities in the quarter-mile areas around their suburban Metrorail stations and have since then become a national model for suburban "transit-oriented development."

Today, many of these older suburban places have transit ridership, walking and car ownership rates that resemble the densest U.S. cities. These outcomes are directly attributable to the presence of the Metrorail system and the amount and type of development built around the stations. Other factors also play a role, such as the federal government's large presence in the region as an employer with many offices located near transit, and a rail-system design that finds a better balance of high-quality inner-city connectivity with regional commuter service when compared with other systems such as BART that were built during the same period. While this dense, mixed development around Metrorail stations has not replaced auto-oriented sprawl in the D.C. region, it has provided an alternative model for development outside of the urban core.

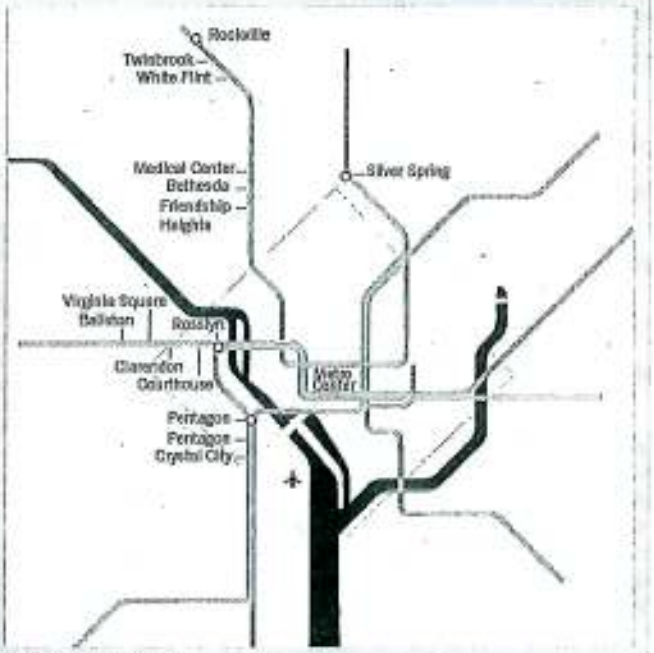
THE START OF SUBURBAN NETWORKS

In contrast with BART and most other U.S. regional rail systems, many suburban D.C. Metrorail stations are immediately surrounded by a dense building pattern. Often made up of office buildings with increasing amounts of residential and retail, these station areas contrast with the low-density suburban form nearby. Compare this with the land-use patterns around BART stations like North Berkeley, Ashby, Fremont and MacArthur, where the suburban development is virtually unchanged since the 1970s.

In particular, the Rosslyn-Ballston Corridor in Arlington County has seen the most change. (For sake of comparison, this corridor of older suburbs is similar to parts of the inner East Bay.) Since 1972, when Metrorail first opened, the corridor has grown from close to 30,000 to nearly 80,000 total jobs.[1] This two-square-mile corridor would occupy fourteen square miles if it were built at typical suburban densities. In the areas around the five main stations (typically a quarter-mile area) there is nearly 60 million square feet of total development.[2] For Arlington County overall, by 2000, nearly two thirds of all jobs and 40 percent of housing units were near Metrorail stations. And since Metrorail opened, 75 percent of new development in Arlington County has been located near a rail station. Surrounding the Rosslyn station alone, there is over 18 million square feet of development, with slightly more office than residential development.[3]

In the newer suburban Montgomery county, Maryland (think Contra Costa county), dense developments exist around stations such as Silver Spring, Bethesda and Friendship Heights (with 15,000, 10,000 and 10,000 daily metrorail boardings respectively). Silver Spring has 7.3 million square feet of office space, 5,200 housing units, and a population density of 15,600 people per square mile — nearly as high as San Francisco's.[4]

SUBURBAN D.C. TOD METRORAIL STATIONS



Source: SPUR analysis

MEASURING SUCCESS

The density and mix of uses immediately surrounding suburban Metrorail stations is the most obvious indicator of TOD success. But to measure outcomes, travel choices are the most important indicator of the effectiveness of suburban TOD.

Over 30 percent of D.C. residents who work outside the city take transit. This compares with only 17 percent of San Francisco residents who take transit to their jobs outside of the city. In general, it is difficult to get a large share of residents to choose transit over driving for reverse commute trips. Not only is there less congestion leaving the city in the morning commute, but parking is usually cheap or free in the suburbs. So to attract reverse commuters, transit must be particularly convenient and work destinations must be directly adjacent to suburban transit. Due to the design of many Metrorail stations outside of D.C., this is the case for many reverse commuters.

The transit use for reverse commuters is even higher when going to jobs at suburban TOD locations. For example, at the Silver Spring Metrorail Center in Montgomery County, Maryland — a 150,000-square-foot office tower 200 feet from the exit of the Metrorail station — 52 percent of workers residing in D.C. took rail to work.

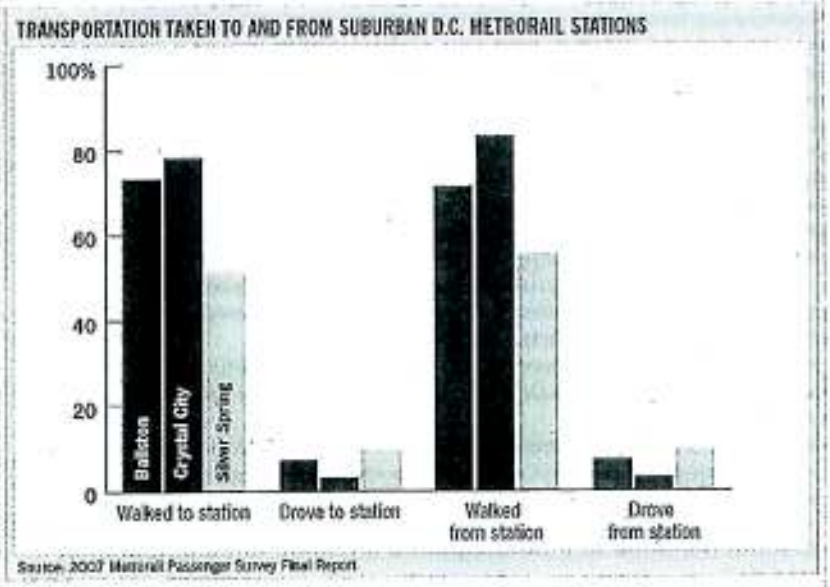
Reverse commutes are important because they make more efficient use of existing infrastructure. Each additional rider in the primary commute direction puts additional strain on already-crowded infrastructure. In contrast, it costs the transit agency very little to fill empty seats in the reverse commute direction, so these fares help to cover operating costs without minimal pressure on capital infrastructure.

High transit use during off-peak periods is just as critical. Suburban residents who would ordinarily drive their cars are taking transit for short, non-work trips. This travel pattern improves efficiency by adding riders during off-peak times when there is available capacity. Similar to reverse commuting, riders captured during these times add fare revenue without adding significant operating costs. Off-peak riders provide a market for retail development at off-peak times, which in turn contributes to a safer, more pedestrian friendly station area.

The low rate of car ownership by residents who live and work near suburban TODs contributes to a healthy dependence on the transit system. In 2004, 38 percent of both Ballston and Rosslyn area residents commuted to work by transit versus 42 percent who drove alone. Ballston area households had 1.2 automobiles per household and Rosslyn 1.1 per household, a very low rate for households outside the region's central city. By contrast, the average San Francisco household has 1.1 cars per household and the national average is 1.5 cars per household.

Users of certain suburban Metrorail stations also have exceptionally high walking rates. The graph on page 16 summarizes these statistics for several key suburban stations.[5] Arrival and departure from a station by foot is a measure of a successful TOD. In short, this gets more cars off the road, reduces traffic impacts on surrounding neighborhoods, reduces the need for parking lots around stations and provides significant foot traffic to enhance safety and enable more successful retail.

The operational efficiencies resulting from the travel behavior discussed above are apparent in the proportion of the Metrorail operating budget that is covered by fares, known as the farebox recovery ratio. For Metrorail the farebox recovery ratio was 71 percent in fiscal year 2008.[6] In contrast, the farebox recovery ratio for BART was 52 percent in fiscal year 2007.[7]



More than 66,000 riders were interviewed for the 2007 Metrorail Passenger Survey to learn by what means (foot, car) riders came to the station, and upon arriving at their stop, how they reached their destination.

WHY IT WORKS

1. Long-term planning and investment.
The high quality and dense environments around suburban Washington transit stations began from the earliest investment decisions. Often, system planners selected more expensive station locations that enabled transformational development patterns, as opposed to locations in existing highway or freight rail rights-of-way. With these up-front investments came patience in realizing a vision. It took 20-25 years for the Rosslyn-Ballston corridor to reach critical mass.

2. Recognized revenue potential from development.
The transit agency, Washington Metropolitan Area Transit Authority, had a fiscal imperative to promote joint development near the stations because it lacked any dedicated funding source. Putting more development immediately near stations provided more riders and revenues. More recently, WMATA has been able to sell the land directly to developers and keep the proceeds (instead of long-term leases, which attracted less interest from developers).

3. Secured local political support from surrounding communities.
The earliest success in TOD occurred in Arlington County where political leaders argued that the Metrorail could be used to help revive a struggling economy. The approach of the political leaders succeeded because of support and buy-in from the local residents who were very involved in decision-making. Resident support was premised on a firm commitment to contain the dense development in a roughly one-quarter mile radius around the stations.

4. Protected existing neighborhoods.
The political leadership made a commitment to protect the existing low-density neighborhoods surrounding the TOD. They also pioneered "zone parking" in areas adjacent to major corridors by restricting parking in the neighborhoods next to job centers. Residents would get parking permits while commuters would not be allowed to park in the nearby residential areas.

5. Recognized local government fiscal benefits to density.
Given the large public debt from the construction of the Metrorail system, building large

amounts of development around the stations was an easy way to pay off this debt through additional property taxes and joint-development agreements without raising taxes for others in the community.

6. Captured more land around the stations than was needed.
WMATA purchased significant amounts of land around suburban stations as it expanded. Because the land uses at the time often had been for farming, the parcels were large and they purchased more land than they needed.

APPLYING IT ELSEWHERE

Some elements of the D.C. TOD story are difficult or undesirable to replicate. For example:

- **The federal government has a policy (dating to the Carter Administration) to locate federal agencies near Metrorail stations.** Federal employees represent nearly 50 percent of all peak period Metrorail riders, providing an unusual boost for some suburban stations. In addition, the federal government has for years provided employees with a $120/month transit subsidy (recently increased to $230/month) — a huge additional incentive for many D.C. region residents to depend on Metrorail.
- **D.C.'s restrictive height limits** made surrounding centers relatively attractive for high-rise, signature office and residential towers, and helped push development that might otherwise have been within the city core into suburban locations.
- **For years D.C. had a very poor reputation because of crime and unreliable government services.** In other cities, this might have led to complete abandonment. In the case of D.C., as the nation's capital, this was not an option. This made locations outside the city, but with very good access, unusually attractive for development.
- **D.C. property taxes were higher than the suburbs.**
- **Some of the development occurred in suburban areas just outside the city,** which makes some of them more like extensions of the urban envelope rather than distinct suburbs.
- **D.C. has low auto-ownership,** which increases the likelihood that D.C.-based reverse commuters will use transit. This supply of transit-dependent suburb-bound commuters helps support efforts to create walkable suburban job centers.

Some lessons from the D.C. area's TODs are more applicable to other regions. For example, we can learn from:

- **A transparent and dependable development review process** that instilled confidence from residents and developers. There was a strong commitment to boundaries for more intense development and protections offered to surrounding, lower-density areas that reduced conflict in the development process. Likewise, jurisdictions established clear processes for developers.
- **A commitment to a balanced mix of uses.** Jurisdictions that are part of WMATA have been committed to balancing residential, office and retail uses around stations. For example, Arlington County required residential development at Metrorail stations even when the market strongly favored retail and commercial. This resulted in more consistent use of the rail network and an environment where retail could thrive and support more feeder-transit services.
- **Connections to existing downtowns.** The downtown area in Silver Springs, Maryland predates the development around its Silver Springs station, located just beyond the town center. Like many downtowns it had declined in the 1960s and 1970s with the rise of other suburban locations, particularly nearby shopping malls. However, with the introduction of the Metrorail station, the National Oceanic and Atmospheric Administration relocated near the station. Later, Discovery Communications consolidated several office buildings into a single structure next to the station. Retail and residential development have since followed, closely connecting the older downtown with the development immediately next to the station.

Ultimately, while there is much to learn from the success of specific development near the transit stations, D.C. also shows us that transit-oriented development will not alone prevent sprawl. Development around transit stations is only a small part of retrofitting suburbia. Areas immediately beyond D.C.'s model TOD stations remain at a standard low-density suburban pattern. The D.C. suburbs and exurbs extend deep into rural areas in Virginia and Maryland because there are no physical barriers and there are existing patterns of small towns around which to sprawl. Drive-alone rates to many of the suburban job centers are scarcely better than those in the Bay Area. And some of the major employment centers do not yet have transit (though there are plans to extend the Metrorail to Tyson's Corner, which, at 22 million square feet of office space, is twice the size of downtown Oakland).

But the suburban TOD that SPUR encountered at D.C. suburban Metrorail stations illustrates an alternative path for willing communities of the more than 100 rail stations in Northern California. ❖

ENDNOTES

[1] Leach, Dennis M. Rosslyn-Ballston Corridor Arlington, VA30 Years of TOD Community Outcomes & Performance Measurements.
[2] Arlington General Land Use Plan, amended through April 2004.
[3] Ibid.
[4] Source: http://www.montgomerycountymd.gov/mcgtmpl.asp?url=/Content/RSC/SilSprng/...
[5] Walk and drive data to Metro stations are based on the 2007 Metrorail Passenger Survey Final Report.
[6] WMATA Approved Fiscal 2010 Annual Budget.
[7] San Francisco Bay Area Rapid Transit District Independent Auditor's Report, 2007 and 2008.

ABOUT THE AUTHORS

Egon Terplan is the Regional Planning Policy Director at SPUR. The author wishes to thank Jonathon Kass of the D.C. Committee on Public Works and Transportation for his substantive contribution to this article.

SPUR | 654 Mission Street, San Francisco, CA 94105-4015 | 415.781.8726

6

CP&DR CALIFORNIA PLANNING & DEVELOPMENT REPORT

The New Suburban Dream

Submitted by Bill Fulton on 31 August 2010 - 5:55pm
Maryland | Bill Fulton

My nephew and his wife recently had their second child, and they are following a well-worn path from the city to the suburbs.

Four years ago, childless and carless, they lived the urban life in the fashionable Washington, D.C., neighborhood of Cleveland Park. Child No. 1 pushed them four miles out, to the expensive inner Maryland suburb of Bethesda, where they bought a cozy two-bedroom condominium that had been converted from an apartment. Then, a couple of months ago, Child No. 2 pushed them another 12 miles farther out – beyond the Beltway – to Rockville, where they bought a four-bedroom, 2,200-square-foot house.

Now they are living the suburban life – which means, inevitably, a large yard, two or three cars, and an autobound life for all concerned, including their infant. Right?

Well, not exactly. Yes, Eric and Kate have headed for the suburbs. But their life isn't really very autobound at all. Suburbia to them means an end-unit townhome, one car, a daily bus trip to day care, a 10- to 15-minute walk to the library and shopping at Rockville Town Square, and D.C. Metro commutes (13 minutes for him, 30 for her) to work and back.

This is America's New Suburban Dream. In a lot of ways, it's just like the old one – the familiar scramble for a great school district, a lot of square footage, distance from urban grittiness, and proximity to schools, parks, and libraries. But in important ways it's different.

When they say they live close to the playground, they don't mean it's five blocks to a city park; they mean it's 30 feet from their barbeque, across the common area of the townhome development. When they say they've traded proximity for space, they don't mean they have to drive five miles to the store. They mean that by living 1,000 yards away from the Rockville Metro Stop – instead of 100 yards – they can get a four-bedroom townhome instead of a two-bedroom condominium.

It's not an urban life, exactly. Their townhome development – dating from the early 1980s – is not exactly a New Urbanist's dream. It's basically a cul-de-sac development bounded on two sides by strip shopping centers. The streets look a lot like parking lots and it's not all that easy to walk along the sidewalks in and of the development, as Eric and Kate often do. It's more Clarence Stein than Andres Duany. Clearly, it was designed to accommodate people expecting to drive to the Red Line station when it opened in 1984. Yet even with these drawbacks, it has an appealing combination of suburban feel and urban access.

And their life is not so urban that they've abandoned their car. The car is an essential component of life on most days – especially to shuttle the kids around, run weekend errands, and, of course, go on vacation. But Eric and Kate use the car differently. The trips are mostly short and it's possible to go a couple of days without using the car at all.

But that doesn't necessarily mean their life is devoid of the good things. A walk of about 15 minutes will take them to the center of Rockville – a surprisingly rich and urbane place and becoming more so all the time. Rockville is the county seat of Montgomery County – an affluent and politically liberal county of almost 1 million people – so there have long been tall office buildings in the downtown. More recently, the city, the county, and private developers – including Federal Realty – teamed up to transform a former in-town shopping mall into Rockville Town Square, a surprisingly dense downtown development project with a library, an "arts and innovation center," shops, and 6-story mixed-use buildings. Not surprisingly, the upper-floor condos aren't

doing well at the moment, but the whole thing is walking distance from the Metro station – and from Eric and Kate's townhome. DuPont Circle or Cleveland Park it's not, but there's enough going on to keep most people – especially most family-oriented people – more than busy.

The walk from Rockville Town Center to the townhome is filled with close-up views of parking lots and strip centers along Maryland 355. This is exactly the kind of property that infill developers and planners salivate over as they think of multi-story mixed-use projects, which in turn terrifies most suburbanites, who fear ever-more-frightening traffic infestation. Amazingly enough for suburbanites, however, Eric and Kate don't seem to be afraid of more urban-style development creeping toward their townhome neighborhood.

Most smart growth evangelists would say that's because they understand the typical party line – that a walkable neighborhood works better as it gets denser, unlike an auto-oriented neighborhood, which breaks down because of traffic congestion when more development arrives. That's true enough – though it's kind of a nerdy way to put it. I'd guess Eric and Kate would think of it differently. To them, living in the suburbs revolves not around driving but around living. Though it's far from perfect, Rockville allows Eric and Kate and their kids to focus on living. Which, I think, has been the point of suburbs from the beginning.

Choosing Where We Live:

Attracting Residents to Transit-Oriented Neighborhoods in the San Francisco Bay Area

A Briefing Book for City Planners and Managers

May 2010

Metropolitan Transportation Commission

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
510-817-5700 PHONE
510-817-5769 TDD/TTY

info@mtc.ca.gov
www.mtc.ca.gov

What Do Bay Area Home-Seekers Want?

Survey respondents scored 35 attitudinal statements from 0 to 10 in terms of importance in influencing their choice of housing. The highest-rated issues are listed in the table at right. Some attributes, such as having access to commuter rail, living in a neighborhood with a mix of housing types, and being able to easily travel to regional centers/ San Francisco, were not very important on average to all movers but were important to certain market segments.

We also asked the respondents to name the one consideration that most influenced their choice of home. The top consideration is proximity to key activities — work, family, friends and school — followed by price. Most Bay Area movers appear to trade off the other desired attributes of their neighborhood after constraining their search by the overriding considerations of price and proximity.

Top 10 Attributes of Desirable Neighborhoods

1. Safe to walk around at night
2. Safe and convenient to walk and bike for errands
3. Clean neighborhood
4. Short commute to work
5. Neighborhood where there are places to spend time
6. Need only one or fewer parking spots
7. Plenty of indoor space
8. Parks nearby
9. Outdoor recreation opportunities nearby
10. Quiet street

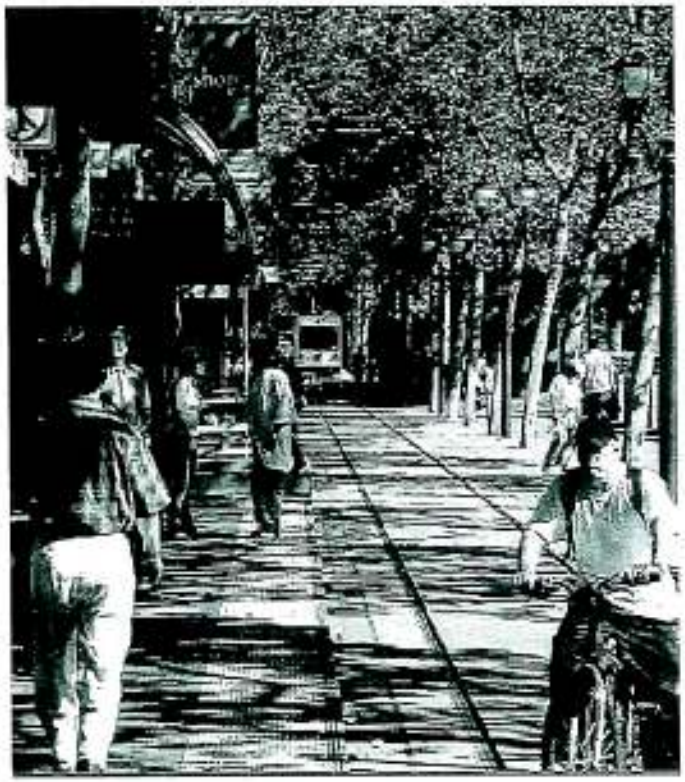
Market Segments Looking for Housing in the Bay Area

Using structural equations modeling to link the attitudes with demographics, the study defines eight market segments of movers.*

- **Transit-Preferring** includes both families with children and student households who rate minimizing travel and access to high-quality transit as most important. They are renters with very low auto ownership rates and relatively low incomes.
- **Urban DINKs** (Double Income No Kids) value minimizing travel and access to high-quality transit and regional centers. They are child-free, have average income, and most have only one car in the household.
- **Young Brainiacs** are very well educated and younger on average. About a quarter have children, and most have only one car in the household. They place a high value on minimizing travel, and on access to high-quality transit and regional centers.
- **Ambitious Urbanites** value all the attributes. They place the highest value on school quality, followed closely by travel minimization, transit accessibility and driving orientation. Most have children and two cars.
- **Mellow Couples** value driving, a quiet and clean neighborhood and being able to walk to do errands. They do not value travel minimization, transit accessibility or access to regional centers. They have higher incomes and are older on average, with few resident children.
- **Kids, Cars and Schools** most value good-quality schools, a quiet and clean neighborhood, and convenient driving. Most are comprised of two working adults, two children and two vehicles.
- **Auto-Oriented, Price-Conscious** place low values on all the surveyed attributes. Some noted that price was a dominant factor in choosing their home. They are predominantly renters, earn a lower income and have a low auto ownership rate.
- **High-Income Suburbanites** are predominantly married couples with high incomes, high auto ownership rates and children. They value convenient driving, and place very little value on transit accessibility, travel minimization or access to regional centers.

* Each of the market segments was given a name — although the names do not always precisely reflect the characteristics of all members of the segment.

Apply Strategies to Attract Target Market Segments



We have grouped strategies that are likely to help in attracting the target segments into six categories:

- Strategies to improve the safety and convenience of walking and bicycling
- Strategies to improve neighborhood appearance and quietness
- Strategies to improve transit reliability, frequency and access
- Strategies to improve school quality and access
- Strategies to improve housing affordability
- Strategies to improve parking management

The choice of target segments and strategies may be based in part on ease of implementation. For example, if a TOD community has suboptimal transit quality and suboptimal walkability, it may be easier for the city to improve the quality of walking in the short term, and then consider ways to improve transit quality in the longer term.

Key Resources:

Pedbikeinfo.org provides a comprehensive set of resources for improving pedestrian and bicyclist mobility and safety.

Toolkit for Improving Walkability in Alameda County, published by the Alameda County Transportation Improvement Authority (2006), provides information on planning for, designing and implementing pedestrian improvements in Alameda County. **www.acta2002.com/ped-toolkit/ped_toolkit_print.pdf**

Community Design and Transportation Program Manual of Best Practices for Integrating Transportation and Land Use
The Valley Transportation Authority publishes this manual of best practices as well as technical guidelines for accommodating bicycles and pedestrians. Call (408) 321-5744 for more information.

Strategies to Improve the Safety and Convenience of Walking and Bicycling

Safe and convenient walking and cycling are vital for attracting most market segments. Substituting walking and cycling for auto trips reduces vehicle miles traveled and creates both cleaner and more quiet neighborhoods. The survey revealed underlying preferences for traveling by these modes, particularly by the strong positive responses to the following two attitudinal statements:

Having a neighborhood where I feel safe enough walking at night was the highest-rated statement and was almost universally valued.

Having a neighborhood where it is safe and convenient to walk and bicycle for errands was the second-highest-rated statement and was also almost universally valued.

Strategies to improve the safety and convenience of walking and bicycling are especially likely to attract the following segments:

- **Urban DINKs**
- **Young Brainiacs**
- **Ambitious Urbanites**
- **Mellow Couples**
- **Kids, Cars and Schools**
- **High-Income Suburbanites**

Follow-up interviews suggest the following strategies would best address the need for a safe and secure neighborhood:

A sense of security when walking is created by the presence of other people — eyes on the street — enjoying restaurants, bookstores, cafes, bars and other nighttime activities. Nighttime lighting, sidewalks and street crossings are also helpful.

The convenience of walking and bicycling is best supported by shortening the distances between destinations; i.e., mixing land uses so that there are local retail and other destinations within a close walk from home. Providing walking and bicycling infrastructure and amenities is also important.

Strategies to Improve the Safety and Convenience of Walking and Bicycling

Strategies

- Zone for higher density nighttime uses to increase the number of "eyes on the street" during evening hours.
- Zone for mixed use to reduce distances from residences and offices to restaurants, stores and other activities.
- Install pedestrian-scale lighting around the TOD to improve both safety and security during evening hours.
- Provide pedestrian and bicycle amenities including wide, continuous sidewalks; well-marked and narrow crossings (e.g., bulb-outs, flashing lights); benches; and bike lanes, secure bike parking in well traveled locations and other biking amenities.
- Create narrow street widths and short blocks to improve pedestrian safety and more access.
- Avoid large underutilized parking lots and other land uses that tend to make pedestrians feel unsafe.

Possible Performance Measures

- Walkability — the website **www.walkscore.com** provides a walkability score using GIS maps.
- Street network walkability indicators, such as intersection density and average block length
- Walk audits conducted by trained members of the community or professionals
- Resident and visitor survey — perceptions of safety and walkability
- Crime statistics

Strategies to Improve Neighborhood Appearance and Reduce Noise

Some market segments have a preference for a quiet and clean neighborhood over other attributes. These market segments mentioned distaste for general blight, broken windows and unkempt public spaces. According to our interviews, perceptions of cleanliness are best enhanced through quick removal of graffiti, trash and unwanted items from public spaces, and through upkeep of landscaped areas, lawns, trees and parks.

Traffic-calming measures on residential streets were widely endorsed by survey participants and considered of high value for reducing the speed of traffic, danger of car crashes and car noise. Noisy late-night parties and cars and motorcycles with loud engines were mentioned as being disturbing.

In spite of traffic-calming measures, it may be difficult to attract those who strongly value a quiet neighborhood to the area immediately adjacent to a transit station/corridor if noise levels are high. Market segments that place a high value on having a quiet and clean neighborhood might be better suited to living either at the periphery of a TOD, farther from sources of noise, or perhaps in a less dense TOD (e.g., a suburban town center rather than an urban downtown).

Strategies to improve neighborhood appearance and cleanliness are especially likely to attract the following segments:

- **Young Brainiacs**
- **Ambitious Urbanites**
- **Mellow Couples**
- **Kids, Cars and Schools**
- **High-Income Suburbanites**

Key Resources:

Transportation for Livable Communities (TLC) grants support community-based projects to improve livability through transportation projects, and are funded through the Metropolitan Transportation Commission (MTC). For more information, see: **www.mtc.ca.gov/planning/smart_growth/tlc_grants.htm**

There are several advocacy groups that maintain Web sites on community noise reduction, including model ordinances and other noise-reduction strategies. See:
www.noiseoff.org
www.quiet.org
www.nonoise.org

Consider scheduling regular community-related neighborhood clean-up programs and small loans to local residents to improve residences.

Strategies to Improve Neighborhood Appearance and Reduce Noise

Strategies to Reduce Neighborhood Noise

- Install traffic-calming measures (speed bumps, stop signs and traffic barriers on busy residential streets).
- Implement/enforce an ordinance to prevent noisy late-night parties.
- Improve pedestrian amenities and pursue Transportation for Livable Communities capital improvement grants.
- Implement/enforce fines for unnecessary honking and engine-revving.

Strategies for Neighborhood Cleanliness

- Quickly remove graffiti, trash and discarded personal belongings.
- Maintain lawns, medians and parks with landscaping.
- Immediately fix broken windows and clean unkempt public spaces.

Possible Performance Measures

- "Quality of neighborhood" assessments or survey results of residents' perceptions of cleanliness and quiet
- Speed of car traffic — posted limits and observed
- Daytime and nighttime decibel levels
- Number of complaints for noise-related issues
- Acres of green space/landscaped space within the neighborhood

Step Three (continued)

Strategies to Improve Transit Reliability, Frequency and Access

Good quality transit service is fundamental to any successful TOD, and is of particular importance to certain market segments, especially the Transit-Preferring, Urban DINKs, Young Brainiacs and Ambitious Urbanites. TODs must be sited in areas with both excellent transit service and well-designed access to make transit appealing and convenient.

There are many strategies for improving the quality of transit service. Transit reliability and frequency of service are particularly important to the target market segments. Improvements in customer service and provision of information also can improve the quality of the transit experience. These could include the provision of well-lit shelters with maps and schedules for all connecting transit systems, real-time transit arrival signs, clean stations, adequate seating and retail amenities in and around the stations or stops. Many of these strategies, particularly increases in the frequency and hours of transit service operation, require significant resources that transit agencies may not possess. External sources of funding, such as tax revenue or funding partnerships with the private sector, can be explored to fund additions to existing transit service.

Improvements in transit quality and access are especially likely to attract the following segments:

- **Transit-Preferring**
- **Urban DINKs**
- **Young Brainiacs**
- **Ambitious Urbanites**

The Urban DINKs and Young Brainiacs rated access to regional centers/San Francisco higher than other segments in terms of its importance to their choice of residential location. Strategies to improve transit could also include provision of good transit access to regional centers/San Francisco (e.g., increase in availability and frequency of dedicated bus service to regional centers/San Francisco, or, for new developments, co-location along rail lines or express bus services that serve regional centers/San Francisco).

Strategies to Improve Transit Reliability, Frequency and Access

Strategies for Transit Reliability and Access

- Design local access to transit to encourage walking and bicycling.
- Locate developments within walking distance of existing or planned high-quality transit routes.
- Enhance station area with dedicated busways or signal priority, and a network feeder system of buses into hub.
- Improve transit amenities related to service (e.g., real-time information, TransLink®, shelters).

Strategies for Transit Frequency/Schedule

- Increase transit service frequency in peak and non-peak hours.
- Extend transit hours of operation into evenings and weekends.

Strategies for Transit Access to Regional Centers/San Francisco*

- Directly link TOD with regional centers/San Francisco* without transfer or added wait time. Provide high level of service at night and on weekends.
- Build dedicated bus lane of express transit to regional centers/San Francisco.*

Possible Performance Measures

- Results of walk/bike audits
- Transit level of service measures
- Quality of transit station or bus stop amenities (lighting, seating, maps, schedules, etc.)
- Percent of residents currently commuting by transit/change in transit ridership over time
- Travel time to San Francisco or other major job and entertainment centers by transit for commuting and evenings/weekends

* These measures reflect the fact that the focus groups conducted for this study indicated some people place a particular importance on being near San Francisco. However, for some individuals, access to other regional job and entertainment centers (e.g., Oakland and San Jose) may be equally or more important.

Key Resources:

There are numerous resources available on strategies to improve transit service, such as reports published through the Federal Transit Cooperative Research Program (TCRP).
www.tcrponline.org

One relevant report focused on Bay Area transit systems is *Designing with Transit: Making Transit Integral to East Bay Communities*. Available from:
www.actransit.org/pdf/designing_with_transit.pdf

Transit systems and markets can be assessed using a "transit competitive index" (TCI) and "service planning tool" (SPT). For an example, see *Using Transit Market Analysis Tools to Evaluate Transit Service Improvements for a Regional Transportation Plan* (TRB 09-199)
www.trb-appcon.org/files/199.pdf

Strategies to Improve School Quality and Access

School quality is important to everyone with kids, and was rated as particularly important to Ambitious Urbanites, Kids, Cars and Schools, High-Income Suburbanites, and to a lesser extent, the Young Brainiacs. If a TOD is already located in an area with good schools, it may be possible to attract these segments if other conditions important to them are present. In these cases, TOD development strategies can take advantage of station areas adjacent to existing good schools — whether public, private or charter schools. This bundling would position a TOD to attract segments that value schools.

For TODs with less distinguished schools, planners can work in the community to advocate for improvements to schools and additional funding for school programs. In cases where significant improvement of local schools is not a viable option in the short term, planners could focus on attracting market segments with less of a priority on schools (i.e., residents without school-aged children) while working in the long term to improve the schools. Segments that reported less of a priority on good schools include the Transit-Preferring, the Urban DINKs and the Mellow Couples.

Strategies to improve school quality and access are especially likely to attract the following segments:

- **Ambitious Urbanites**
- **Kids, Cars and Schools**
- **High-Income Suburbanites**
- **Young Brainiacs**

Strategies to Improve School Quality and Access

Strategies for School Quality

- Co-locate TODs with good-quality schools.
- Establish financial support for local schools from TOD.
- Advocate for more funding for school programs.
- Include child-supportive amenities near transit, including child-care centers and after-school programs.
- Engage with/support local parent-teacher associations (PTAs).
- Engage local school officials or staff to address ways to improve the school.

Strategies for Access to Schools

- Create compact design for school campuses to ensure schools can be built in proximity to TOD housing.
- Prioritize walking/improve sidewalks and initiate "safe routes to schools" community-based programs.
- Establish bicycling programs with designated routes and safe bicycle parking at schools.

Possible Performance Measures

- School test scores/dropout rates/awards for quality schools or teachers
- Level of parental involvement in PTA/school activities
- Walk audit ratings for access to local school(s)
- Measures of competitiveness, such as length of waiting lists for placement in school
- Share of credentialed teachers
- Average expenditure per pupil

Key Resources:

The University of California Berkeley Center for Cities and Schools publishes papers on improving school quality in a smart growth context, such as *Smart Schools, Smart Growth: Investing in Education Facilities and Stronger Communities* (2009). Available at: **www.citiesandschools.berkeley.edu**

Safe Routes to Schools offers funding and resources for programs to support walking and bicycling to school. See **www.saferoutestoschools.org** **www.saferoutesinfo.org**

Step Three (continued)

Strategies to Improve Housing Affordability

Affordable housing is essential for lower-income market segments to be able to live in TODs that are in high demand. The Transit-Preferring and Auto-Oriented, Price-Conscious segments would most benefit from strategies to improve housing affordability, as they are the lowest-income market segments, but a significant share of other market segments are also low- and middle-income.

There are various approaches to maintaining and/or creating affordability. Local jurisdictions can:

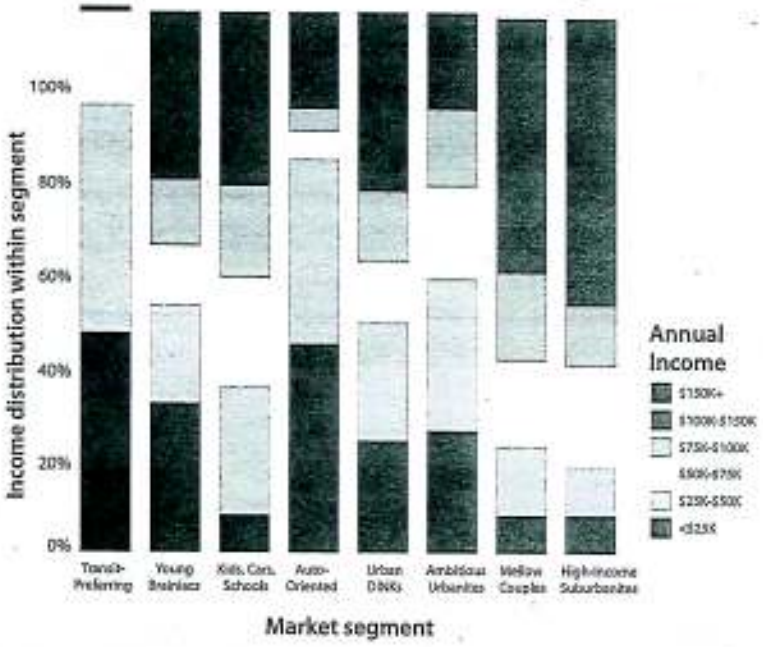
- Directly address the inclusion of affordable housing through requirements attached to permits for developers, such as requiring that a percentage of homes be affordable based on standard formulas (i.e., "inclusionary housing"), and/or the incorporation of accessory units ("granny flats"), co-housing, co-ops or rental units. These requirements are often paired with allowances for construction of additional units or additional density ("density bonuses"). Local jurisdictions can also assist lower-income residents through first-time home purchase programs and low-cost loan programs for purchase or improvements.
- Assist affordability through measures that reduce transportation costs. For example, local jurisdictions can require the unbundling of parking costs from housing costs, allow or require the provision of free or discounted transit passes, and provide carshare, usually in exchange for reducing parking requirements on the developer.
- Expedite the entitlement process and support higher-density development, thereby increasing the supply of TOD units, to help reduce their price.

While addressing affordability, developers must also either be able to attract sufficient numbers of residents paying market rates or receive government subsidies for projects to be built.

Strategies to improve housing affordability are especially likely to attract the following segments:

- **Transit-Preferring**
- **Auto-Oriented, Price-Conscious**

Income Levels of Market Segments



Strategies to Improve Housing Affordability

Strategies

- Provide inclusionary housing and encourage/permit shared housing, co-ops and/or other forms of affordable housing.
- Provide support for housing costs through federal, state and local programs.
- Unbundle housing and parking fees, or offer reduced parking and parking cash-out for residents.
- Support measures to increase the supply of TOD housing, such as expediting the entitlement process for developers.
- Provide discount transit tickets or monthly/long-term passes through universal residential passes or other programs.
- Develop/support utilization of first-time home purchase assistance programs.
- Provide/support utilization of low-cost loans to improve property for low-income residents.

Possible Performance Measures

- Percent of affordable/discounted units in TOD
- Comparison of housing costs to income levels using federal standards
- Availability of reduced-cost transit passes
- Availability of parking opt-out/cash-out
- Comparison of TOD housing costs to local/city/regional average housing costs
- Comparison of combined housing and estimated transportation costs to local/city/regional averages
- Availability/use of home purchase or improvement programs for low-income households

Key Resources:

The Mixed Income Housing TOD Action Guide (2009) presents a three-step analysis procedure for determining the most effective strategies and tools for supporting affordable housing around TODs. Available from: **www.reconnectingamerica.org**

Building for the Boom (2009) highlights promising practices and models to provide support for low-income senior communities. For more information, see **www.smchousing.org**

There are numerous organizations throughout the Bay Area dedicated to assisting in developing affordable housing. One is Housing Endowment and Regional Trust (HEART) of San Mateo County, an organization working to create affordable housing for low- and moderate-income families, students and seniors. For more information, see **www.heartofsmc.org**

Step Three (continued)

Strategies to Improve Parking Management

People in some market segments want to drive around easily and have convenient access to freeways, readily available parking and private garages. These interests may be difficult to meet in the context of a transit-oriented development, since TODs are built at high densities that cannot always accommodate abundant parking and garages for each residence. In addition, TODs that provide convenient driving and parking may not be able to produce the high levels of transit usage, walking/bicycling and other benefits that are key goals of TOD programs, such as reductions in vehicle miles traveled, air-quality emissions and greenhouse gas production, and increases in the physical activity of residents.

However, it is possible to partially meet the interest in convenient driving by making sure the parking supplies at the TOD are well-managed. Parking policies and management can be used to:

Provide parking for residents who are willing to pay for it by unbundling the cost of parking from housing, and allowing those who value parking to obtain it even in a parking-restricted TOD, thus making the most of the limited parking supply;

Share parking among users with demand at different times of day or days of the week, making fuller use of limited parking;

Implement car-sharing to provide for the use of cars by residents beyond their level of parking and car ownership; and

Reduce the negative impacts of cars through careful placement of entrances and exits, parking lifts that reduce the footprint of parking, information systems that reduce cruising for parking and design approaches that favor pedestrians in the neighborhood.

Strategies to improve parking management are likely to especially attract the following segments:

- **Ambitious Urbanites**
- **Mellow Couples**
- **Kids, Cars and Schools**
- **High-Income Suburbanites**

Key Resources:

The Metropolitan Transportation Commission guidebook *Reforming Parking Policies to Support Smart Growth: Parking Best Practices for Supporting Transit-Oriented Development in the San Francisco Bay Area* provides a comprehensive set of strategies for managing parking to support smart growth and transit-oriented development. Available from: **www.mtc.ca.gov**

San Francisco has a new approach to parking management combining innovative technologies and strategies. Available from: **www.sfmta.com/SFpark**

Strategies to Improve Parking Management

Strategies

- Unbundle residential parking, allowing interested parties to purchase more parking than average in a parking-restricted TOD environment.
- Require or support car-sharing programs at new developments above a threshold size, or develop shared programs between businesses, government agencies and residents to allow additional access to cars beyond the level of parking/residential car ownership.
- Implement residential permit parking to establish or maintain preferential access to street parking for local residents.
- Allow and support technological improvements such as parking lifts, web- or phone-based payment and parking information systems.
- Allow shared parking among users with different schedules of demand.

Possible Performance Measures

- Availability of residential parking at the TOD for purchase/rent (length of waiting list)
- Parking occupancy rates, average time spent looking for parking for residents of TOD
- Availability of car-share cars (number of cars at site, within one-quarter mile per resident, preregistration time required)
- Safety, comfort and convenience of residential parking

CP&DR CALIFORNIA PLANNING & DEVELOPMENT REPORT

Walkscore As A Planning Tool

Submitted by Bill Fulton on 4 February 2010 - 3:26pm
Bill Fulton

According to walkscore.com, I work in a walker's paradise. The walkscore of our office in Ventura, California, is 95.

I also live in a pretty good walking environment. My duplex has a walkscore of 78—and that's way better than the walkscore in the cavernous suburban house I used to live in, which was 3.

So, what's all that worth?

The answer is something. Your walkscore now shows up on Zillow.com and Ziprealty.com when somebody checks out your house. Recent real estate research has found that houses with high walkscores command a price premium, all other things being equal.

The permutations are endless – as we learned this afternoon at the New Partners for Smart Growth conference in Seattle.

At a panel this afternoon, Matt Lerner, the Chief Technology Officer of Front Seat – creator of walkscore.com – was one of several folks who talked about how walkscore is affecting real estate markets and planning processes.

Not only does your walkscore show up on Zillow and Ziprealty now, real estate agents in urban areas are using high walkscores in ads. The clear implication is that walkability is a selling point – and walkscore.com is pushing the idea more and more. "Our whole theory of change with walkscore is that people who otherwise wouldn't care about walking or transit are hungry for information for real estate." Lerner said. "This is a way to talk to them in way that will affect their future carbon footprint and their health." He noted that, other than LEED, "there are no smart growth metrics in the real estate listings."

He said walkscore is adding transit accessibility, roadway networks and "real" walking routes (rather than as-the-crow-flies), and provides its data to any researcher who wants to use it.

In particular, he said, walkscore plans to add road width, road speed, and density of intersections as measurements of connectivity, not just distance.

Lerner also said walkscore can be used over time, to show which neighborhoods are getting more walkable and which are getting less walkable.

It's also possible to use walkscore on planning projects. Harriet Tregoning, planning director for the District of Columbia, said she is using walkability as a metric in neighborhood planning – and said that even re-planning of Edge City employment centers such as Tysons Corners (which, by the way, has a walkscore of 80) can use walkscore as a way to measure outcomes.

Tregoning said walkscore holds great potential as a way to inform discussions about plans. "Everybody wants all that stuff [meaning coffee shops, libraries, bookstores, etc.] walking distance to their house," she said. "It's hard to explain that at four units per acre you're not going to get it, and that vast parking lots won't get it for you either. Walkscore is a way to show the you have to have enough people and enough foot traffic to get it."

A number of questioners asked whether walkscore was going to move toward the idea of "placescore." Lerner said they were considering it and had even thought about creating a "Jane Jacobs score" by converting Jacobs' criteria for vibrant neighborhoods into an algorithm. But, he said, "It starts to feel a little more political

because we'd be saying to people, your neighborhood isn't healthy. Walkscore is more objective. Some realtors tell us their clients like a low walkscore because it's the get-away-from-it-all score."

– Bill Fulton

Walk Score of Civic Center Dr and McInnis Parkway San Rafael CA http://www.walkscore.com/score/Civic-Center-Dr-and-McInnis-Par...

Are Suburban TODs Over-Parked?

Robert Cervero, Arlie Adkins, and Cathleen Sullivan
University of California, Berkeley

Abstract

A survey of 31 multi-family housing complexes near rail stations in the San Francisco Bay Area and Portland, Oregon, show peak parking demand is 25-30 percent below supplies and, for most projects, falls below national standards. Peak parking demand is generally less for less expansive projects with short walking distances to rail stations that enjoy frequent peak-period services. Case study experiences suggest that well-designed, short and direct walking paths to rail stops lessen peak parking. A national survey of 80 U.S. cities with rail stations revealed that 75 percent have minimum TOD parking requirements that mandate more parking than suburban design standards and 39 percent grant variances for housing projects near rail stops.

Parking and Transit in the U.S.

Excessive parking could explain why transit-oriented development (TOD) in the United States often has failed to yield hoped-for benefits, such as big ridership gains and less traffic congestion. Critics charge that many large-scale housing projects near urban rail stations are "over-parked"—more parking is provided than is needed (Daisa 2004; Dunphy et al. 2004). This can drive up the cost of housing, consume valuable land near transit, and impose such environmental costs as increased impervious surface area.

Part of the blame for the surfeit of parking in TODs could be the reliance on parking generation figures from the Institute of Transportation Engineers (ITE). Implicitly, ITE standards assume that car ownership levels are no different in rail-served and non-rail-served areas. Outdated parking standards have a way of perpetuating

themselves. A study of Southern California communities, for example, found the vast majority based their parking requirements on those of surrounding communities or ITE standards, and only 3 percent conducted their own parking studies (Willson 2000).

Research suggests neighborhoods designed according to TOD principles, including below-norm parking, are associated with lower car ownership rates (Dunphy 2004; Cervero et al. 2004; Renne 2009b), appreciably higher transit modal splits for commuting (Cervero 1994; Lund et al. 2006), and fewer vehicle trips per day (Cervero and Arrington 2008). In 2000, the number of AM peak vehicle trip ends per dwelling unit was measured at 0.17 for the Rosslyn-Ballston TOD corridor in Arlington County compared to an ITE average for similar housing of 0.54—a threefold differential (Cervero et al. 2004).

The full cost of excessive parking supplies is large (Shoup 2005). From the private consumer standpoint, mandatory parking codes (e.g., two off-street spaces per dwelling unit) unnecessarily drive up the price of housing (Poticha and Wood 2008). Podium, tuck-under parking, or underground parking spaces can add upwards of $60,000 to the cost of housing in pricey markets such as the San Francisco Bay Area. Requiring more parking than is needed also deters central-city redevelopment, thus shifting growth to auto-oriented suburbs (Loukaitou-Sideris and Banjeree 2000; Hess and Lombardi 2004). From a larger societal standpoint, excess parking supplies impose such costs as inordinate land consumption (particularly in the case of surface lots); creation of more impervious surfaces that pollute streams and water supplies as well as raise temperatures (through heat-island effects); increased separation of buildings, which deters walking and encourages motorized travel; and the blemishing of natural landscapes.

Why might parking demand fall below parking supply for TOD housing projects? Part of the explanation is "self-selection"—for lifestyle reasons, including the desire to transit commute and reduce household expenditures on cars, people move into neighborhoods well-served by transit (Boarnet and Crane 2001). Using nested logit analysis, a recent San Francisco Bay Area study estimated that 40 percent of the increased odds of rail commuting among TOD residents are due to self-selection (Cervero 2007).

Why, then, do planners continue to use ITE parking generation numbers? One reason is that it is difficult to break away from standard practices in the transportation field, often for political reasons, such as a fear among businesses of insufficient customer parking and among residents that parking will spill into their neighbor-

hoods (Shoup 2005). In the past, the Urban Land Institute recommended that suburban commercial projects be parked above conventional standards as a "marketing advantage" and cautioned "when in doubt, over-build parking" (Dunphy 2004). Remarked the developer of a recently opened 449-unit apartment building atop a Los Angeles subway station: "We never reduce the amount of parking at our developments. People still want their cars," adding that "Nothing would make us happier than to reduce the expensive underground parking" (Karp 2008).

Continued reliance on ITE numbers to judge the parking needs of new transit-oriented housing is cause for concern, given the growing market demand for housing near transit. The Urban Land Institute (2004) has estimated that around one-third of newly-formed households in large metropolitan areas of the U.S. are highly receptive to TOD living. The Center for Transit Oriented Development (CTOD) predicts that the demand for housing near transit in America will more than double by 2030 (Poticha and Wood 2009).

This study empirically investigates the proposition that TOD, and specifically housing near suburban rail stops, is "over-parked" in the U.S. This is done by comparing parking generation rates for 31 housing complexes near rail stops in the San Francisco Bay Area and Portland, Oregon, with on-site parking supplies and with ITE parking generation rates. The ITE rates, representing averages for mostly suburban settings in the U.S., effectively serve as the "control group." Factors that explain parking demand also are investigated, both statistically and through case analyses. The results of a national survey on parking codes of 80 U.S. cities with rail stops also are presented. The paper ends with several policy prescriptions that fall out of the research findings.

Empirical Analysis

To compare actual parking demand to supply levels and ITE rates, data were compiled for 31 multi-family rental housing projects in two rail-served areas: Metro Portland, Oregon (15 projects) and the East Bay of the San Francisco-Oakland Bay Area (16 projects). These two regions were chosen, in part, to compare results to a recent study of TOD vehicle trip generation rates conducted in both areas, published in this journal (Cervero and Arrington 2008). All of the surveyed housing projects were within two-thirds of a mile of the nearest rail stop (the mean straight-line distance was 1530 feet, or a little over a quarter mile). We refer to

these projects as "transit oriented" purely in terms of their walkable proximity to a rail stop.

Table 1 summarizes key attributes of the projects, organized by the four BART (Bay Area Rapid Transit) heavy-rail stations in the East Bay and the nine MAX light-rail stations in Metro Portland that were closest to the projects. The ITE mean estimated parking generation rate is 1.2 vehicles per unit at peak periods. Table 1 shows that parking supplies clearly exceed this figure in most cases: at only one of the 13 rail stations in Portland (E. 162 Ave.) was the average parking supply of all nearby multi-family housing projects below the ITE rate (and just barely). Among the 31 individual projects, only two (Sequoia Square near the E. 162 Ave. station and Diablo Oaks near the Pleasant Hill BART station) had fewer than 1.2 spaces per dwelling unit. The number of parking spaces per dwelling unit for all 31 projects (i.e., the weighted average statistic) was 1.57, or about 31 percent above the ITE standard. Housing projects in the East Bay had particularly inflated parking supplies relative to ITE's standards.

Given the suburban setting and character of most surveyed projects, many featured garden apartment designs. Of the 31 projects, 17 were 3 stories in height, 11 were 2 stories, and 4 were 4 stories. Table 1 reveals the expansiveness of many projects, with the surface area (devoted to parking, driveways, open spaces, swimming pools, etc.) typically being more than twice as large as the footprint of the buildings. Among the 31 projects, the mean building coverage rate was 31 percent, ranging from 18 percent to 54 percent. Projects in Metro Portland tended to be closer to stations than in the East Bay. East Bay projects, however, were generally in denser neighborhoods with relatively higher incomes.

Data Collection

Housing projects that were suburban in character and within walking distance of rail stops in both regions were chosen for the study. Efforts also were made to collect data from some of the same projects used to study TOD trip generation (Cervero and Arrington 2008). Further winnowing down the sample frame was the agreement of property owners and building managers to allow the research team to collect data on site. This was not always easy because of (1) *when* data were collected—the wee hours of the morning when most tenants are at home asleep, thus constituting "the peak"; and (2) *how* data were collected—driving through each project and visually counting parked cars. In the end, 31 property owners and managers agreed to let the research team on their sites to compile data.

Table 1. Background Information on TOD Housing Projects

		Project*					Neighborhood**	
	Project Name	No. Units	No. Off-Street Parking Spaces	Parking Spaces/ Unit	% Land Area Covered by Bldgs	Shortest Walking Distance to Station (ft.)	HHs/Res. Acre w/in ½ mile of Station	% HHs w/Income > $75K/ Year
East Bay BART Stations								
Bayfair (San Leandro)	The Hamlet	145	186	1.28	23.6	2000	7.2	24.5
Fremont	Archstone, Alborada, Mission Peaks, Park Vista, Presidio, Sun Pointe Village, Watermark Place	324	597	1.87	32.0	1723	7.5	43.5
Pleasant Hill	Archstone, Archstone Station, Diablo Oaks, Iron Horse Park, Park Regency, Villa Moncanaro	357	516	1.40	36.1	2,511	10.2	34.6
Union City	Parkside, Verandas	245	364	1.48	34.6	1,450	5.1	41.4
All 16 Projects (unweighted)		315	512	1.61	33.3	2,826	8.2	38.7
Metro Portland MAX Stations								
Beaverton Creek (Beaverton)	Centre Point	264	422	1.60	17.8	2,534	3.6	16.9
E. 148 Ave. (Portland)	Dalton Park	36	47	1.31	36.6	1,718	3.6	12.8
E. 162 Ave. (Portland)	Morgan Place, Rachel Anne, Sequoia Square	55	64	1.19	34.2	833	5.3	11.6
Elmonica/SW 170th Ave. (Beaverton)	Elmonica Court, Cambridge Crossing	198	379	1.82	24.5	2,198	3.1	22.6
Gateway/NE 99th Ave Transit Center	Gateway Park, Gateway Terrace	101	142	1.46	30.8	1,723	3.8	10.4
Gresham Transit Center (Gresham)	Gresham Central	90	130	1.44	32.2	767	3.1	11.4
Orenco/NW 231st Ave (Hillsboro)	Orenco Gardens	264	405	1.53	29.9	592	1.7	33.8
Quatama/NW 205th Ave (Beaverton)	Briarcreek, Quantama Crossing, Quantama Village	378	573	1.49	27.2	1,939	3.5	23.2
Willowcreek/SW 185th Ave (Beaverton)	Wyndhaven	396	536	1.35	32.7	883	2.6	18.1
All 15 Projects (unweighted)		196	299	1.45	29.6	1,510	3.6	17.6

* Weighted Averages: Weighted by number of units in project

** Source: Center for Transit Oriented Development 2000 U.S. census data

Empirical data were collected during the late spring and early fall of 2008, corresponding to the non-rainy period of both regions when school was still in session, both considered to be peak conditions for parking. All parking counts were made on a mid-week day when the odds of someone being away for an extended weekend were the least. Data on the number of cars parked in on-site parking stalls (including smaller stalls for motorcycles) were collected during both the peak period (defined as 12 midnight to 5 a.m.) and the off-peak (10 a.m. to 2 p.m.).

Comparison of Parking Generation Rates

Given that most surveyed housing projects had parking supplies that exceeded ITE standards, was the seemingly over-supply of parking backed up by demand numbers as well? That is, is there empirical evidence that TODs are over-parked?

Parking demand levels recorded for the surveyed projects were compared to the number of parking stalls as well as rates from the 2003 ITE manual for "Low/Mid-Rise Apartments" (Land Use Category 221) in suburban locations. As noted, ITE's average rate of peak parking on weekdays is 1.2 vehicles per unit. This is a weighted average drawn from 19 data observations. (The ITE manual defines weighted average as the sum of parked vehicles for all projects divided by the number of dwelling units.)

The weighted-average peak-parking demand for all 31 projects was 1.15. This is 27 percent below the weighted-average peak parking supply shown earlier in Table 1 (i.e., 1-1.15/1.57 ≈ 0.27, or 27%). It is just 4 percent below the ITE rate, however (i.e., 1-1.15/1.20 = 0.04, or 4%). For Metro Portland, the weighted average demand was 1.07 parked vehicles per dwelling unit, and for the East Bay, it equaled the ITE target—1.2.

Figure 1 breaks down the findings for the 31 individual projects. In Metro Portland, peak parking occupancies were less than supplies in all instances and less than the ITE rate for 12 of the 15 surveyed projects. In the case of the 57-unit Gateway Terrace apartment complex near the MAX's Gateway Station, parking demand was less than half the ITE average rate and two-thirds below supply levels (i.e., only one third of stalls were occupied). Factors such as relative high vacancy rates could explain lower demand for some of these projects; however, in general, vacancy rates for surveyed rental projects were similar to regional averages and implicitly, we assume, to projects in the ITE database. We acknowledge, however, that empty rental units translate into empty parking stalls and, in some instances, relatively low parking demand could be a result of relatively high vacancy rates.

Site	Supply per Unit	Peak Demand per Unit	Demand: % diff. from Supply	Demand: % diff. from ITE Rate
Beaverton Creek Station				
Center Pointe	1.6	1.23	-23.1%	2.5%
Elmonica Station				
Elmonica Court	1.50	0.90	-40.0%	-25.0%
Cambridge Crossing	2.15	1.04	-51.6%	-13.3%
Willow Creek				
Wyndhaven	1.35	0.90	-33.3%	-25.0%
Quantama Station				
Briarcreek Apartments	1.50	1.12	-25.3%	-6.7%
Quatama Crossing	1.55	1.32	-14.8%	10.0%
Quatama Village	1.41	1.37	-2.8%	14.2%
Orenco Station				
Orenco Gardens	1.53	0.76	-50.3%	-36.7%

Site	Supply per Unit	Peak Demand per Unit	Demand: % diff. from Supply	Demand: % diff. from ITE Rate
Gateway Station				
Gateway Terrace	1.58	0.53	-66.5%	-55.8%
Gateway Park	1.34	0.82	-38.8%	-31.7%
E. 148th Ave. Station				
Rachel Anne	1.41	0.88	-37.6%	-26.7%
Dalton Park	1.31	1.17	-10.7%	-2.5%
E. 162nd Ave. Station				
Morgan Place	1.31	0.65	-50.4%	-45.8%
Sequoia Square	0.84	0.79	-6.0%	-34.2%
Gresham Central Station				
Gresham Central	1.44	1.00	-30.6%	-16.7%
ALL 15 PORTLAND STATIONS				
Weighted Average	1.52	1.07	-30.0%	-11.0%

Figure 1. Metro Portland Results: Peak Parking Generation Rates (Parked Vehicles per Dwelling Unit) Relative to Supply Levels and ITE Standard

Site	Supply per Unit	Peak Demand per Unit	Demand: % diff. from Supply	Demand: % diff. from ITE Rate
Walnut Creek: Pleasant Hill BART Station				
Diablo Oaks	1.05	0.74	-29.5%	-38.3%
Iron Horse Park	1.42	0.80	-43.7%	-33.3%
Archstone Walnut Creek	1.12	0.92	-17.9%	-23.3%
Park Regency	1.47	1.06	-27.9%	-11.7%
Archstone Walnut Creek Stat.	1.29	1.09	-15.5%	-9.2%
Villa Montanaro	2.05	1.23	-40.0%	2.5%
San Leandro: Bayfair BART Station				
The Hamlet	1.28	1.07	-16.4%	-10.8%
Union City BART Station				
Verandas	1.50	1.11	-26.0%	-7.5%
Parkside	1.46	1.13	-22.6%	-5.8%
Fremont BART Station				
Presidio	1.82	1.23	-32.4%	2.5%
Watermark Place	1.84	1.27	-31.0%	5.8%
Mission Peaks	1.75	1.35	-22.9%	12.5%
Archstone Fremont	1.98	1.45	-26.8%	20.8%
Sun Pointe Village	1.98	1.47	-25.8%	22.5%
Park Vista Apartments	1.97	1.48	-24.9%	23.3%
Alborada	1.78	1.69	-5.1%	40.8%
ALL 16 EAST BAY STATIONS				
Weighted Average	1.59	1.20	-24.7%	0.0%

Figure 1. (cont'd.) East Bay Results: Peak Parking Generation Rates (Parked Vehicles per Dwelling Unit) Relative to Supply Levels and ITE Standard

In the East Bay, owning and parking a car seemed to be a bit more of a necessity for TOD residents. None of the surveyed East Bay lots was saturated, with, on average, around 25 percent of stalls empty; however, this occupancy rate was higher than in Metro Portland. The weighted average parking rate of 1.2 for East Bay sites matched ITE's standard, though with a fair amount of variation. At three of the four East Bay stations, nearby parking demand was considerably less than the ITE rate. Below-rate parking levels characterized most projects near the Pleasant Hill BART station, one of the East Bay's first "transit villages" (Bernick and Cervero 1997). The Fremont BART station is an outlier, inflating the East Bay average. For all projects near Freemont BART, parking levels exceeded the ITE rate, by as much as 41 percent.

In general, overestimation of parking demand suggests people are shedding cars, taking advantage of the accessibility benefits of living near high-quality transit. Fewer cars per household should translate to fewer parked cars. Little is known about car ownership levels for the surveyed projects however some insights can be gained from modal split statistics. In the East Bay, a 2003 survey of residents living in the Verandas Apartments near Union City BART and Park Regency near Pleasant BART found that 54 percent and 37 percent, respectively, commuted to work by transit (versus a 2000 census figure of 10.6% of commuters in the nine-county San Francisco Bay Area) (Lund et al. 2004). These high transit mode splits were matched by our findings of relatively low parking demand: 8 percent and 12 percent below the ITE rate for Verandas and Park Regency, respectively. While none of the Metro Portland projects in our sample have been surveyed for modal splits, one study estimated the share of commute trips by transit among those living within ½ mile of the Elmonica and Orenco MAX Stations at 30 percent and 24 percent, respectively (versus a 2000 census transit commute share of 6.4%) (Dill 2006). Our surveys found peak-parking demands considerably below ITE rates for both stations (see Figure 1).

While car-shedding no doubt occurs among those living near transit, it might not be as extensive as assumed, particularly among those living in car-dependent suburbs. This is suggested by comparing the differentials between parking generation rates and vehicle-trip generation rates relative to their respective ITE manuals. A recent study of five TOD housing projects in the East Bay and five in Metro Portland found clear evidence of "trip de-generation": the weighted average of vehicle trip rates were 40 percent and 27 percent below that estimated by ITE trip generation rates (Cervero and Arrington 2008). As shown in Figure 1, the weighted differential for parking generation matched the ITE rate for East Bay projects and was 11 percent below for Metro Portland projects. Owning and parking a car was particularly a necessity for Fremont's TOD residents.

What's going on? It is likely that in most suburban TODs, which characterizes the 31 projects in our survey, residents still need access to a car. They just do not use them as much to get to work. But like most suburbanites, they still need a car to get to most non-work destinations, the vast majority of which are away from rail stops. While transit-oriented housing might mean that more trip *origins* are near rail stops, as long as most *destinations* are not, many TOD residents still will own cars and use them for shopping, going out to eat, and the like. One policy response to this finding, discussed in the conclusion, is to create car-sharing programs in rail-served neighborhoods. Car-sharing would enable residents not only to rail-commute but also to shed one or more cars.

Why Do Rates Vary?

To probe factors that might explain why peak parking demand varies among transit-oriented housing projects, this section presents several best-fitting multiple regression equations. The influences of both on-site and off-site factors on parking demand are investigated. Among on-site factors considered as possible predictors were parking supplies, project size (e.g., land acreage), project density (e.g., land coverage percentages, dwelling units per acre), project design (e.g., whether a gated project, whether surface or structured parking), distance to the region's CBD, and average rents (a proxy for tenant income levels). A longer list of off-site candidate variables was also considered for model entry, including walking distance, a circuitry index, transit service levels (e.g., headways), road designs (e.g., road widths and presence of nearby freeway interchange), and a number of variables denoting neighborhood attributes within ½ mile of stations, including housing density, income levels, and the presence of retail shops. This analysis thus draws from a substantial literature that holds that various built-environment factors, such as urban densities and walking quality, have a significant bearing on travel behavior (Ewing and Cervero 2001; Handy 2005).

Table 2 presents the best-fitting multiple regression equation for predicting peak parking demand that yielded results consistent with theory and expectations. The two most significant on-site factors—parking supply and project land area—were strongly associated with increased parking demand. These two factors probably are not independent since more spacious land area allows for more parking supply and, in general, a more car-oriented built environment (e.g., wider internal roads). Holding other factors constant, the model estimates that reducing parking by 0.5 spaces per unit will lower peak demand by 0.11 parked cars per unit.

Table 2. Best-Fitting Multiple Regression Equation for Predicting Peak Parking Rates

	Dependent Variable: Peak Parking per Dwelling Unit			
	Coeff.	*Std. Err.*	*t Statistic*	*Prob.*
Parking Supply: Parking spaces per dwelling unit	0.225	0.122	1.84	.077
Land Area: Project's land acreage	0.001	0.006	2.254	.033
Walking Distance: Shortest distance along sidewalk network from project center to station, in 1000 ft	0.689	0.307	2.223	.035
Peak Rail Headways: Minutes between trains in AM peak at nearest station	0.059	0.019	3.111	.005
Metro Portland Project: 1 = yes; 0 = no	-0.182	0.078	-2.341	.028
Constant	0.122	0.199	0.615	.544
Summary Statistics: F statistics (prob.) = 10.657 (.000) R Square = .681 Number of Cases = 31				

Among off-site factors, the only two candidates that yielded statistically significant results were walking distance and peak headways of nearby rail services. The model suggests that for every 1,000 feet of walking distance that a project lies away from a station, peaking parking can be expected to increase by 0.7 cars per dwelling unit, all else being equal. Longer headways, denoting less frequent train services, also seem to be an inducement to car ownership and high peak parking demand. A fifth variable in the equation, "Metro Portland Project," served as a fixed-effect control, denoting less peak parking demand in Metro Portland vis-à-vis East Bay projects. Fixed-effect factors aim to capture the uniqueness of observations from the same city; thus, the significance of this variable could be capturing Portland's legacy as a pro-transit, smart-growth setting.

While Table 2 reveals a model with fairly good statistical fits—explaining two-thirds of the variation in peaking parking demand—some variables that we felt might be significant were not. Notably, once controlling for walking distance, the circuity of the walk was not significant. This is consistent with findings from other studies showing that quality of walking environment and micro-design features (e.g., presence of street trees) have relatively little influence on travel behavior among those living within five minutes of a station (Cervero 2001; Lund et al.

2004). Other non-significant predictors included project density, rent levels, and socio-demographic characteristics of the surrounding neighborhood.

Figure 2 presents a sensitivity analysis of the two variables over which TOD housing developers have some influence: parking supplies and walking distance to a station. Based on the best-fitting multiple regression equation and using mean values for other predictors (i.e., 8 acres of land surface and 8-minute AM peak headways), the figure plots predicted peak parking demand over a range of parking supply and walking distance data. This plot applies to Metro Portland cases (i.e., the variable "Metro Portland Project" was set at 1); however, the same patterns hold for East Bay projects as well (notably, the Y-intercepts of the sloping lines simply slide up by a value of 0.182). For example, the model predicts that at 1.25 parking spaces per unit (roughly ITE's recommended rate) at 500 feet walking distance from a station, peak parking demand is slightly above 1 space per dwelling unit. At a generous supply of 1.75 spaces per unit and a quadrupling of distance to 25,000 feet, it shoots up to 2.5 parked cars per dwelling unit. Clearly, supply and distance matter.

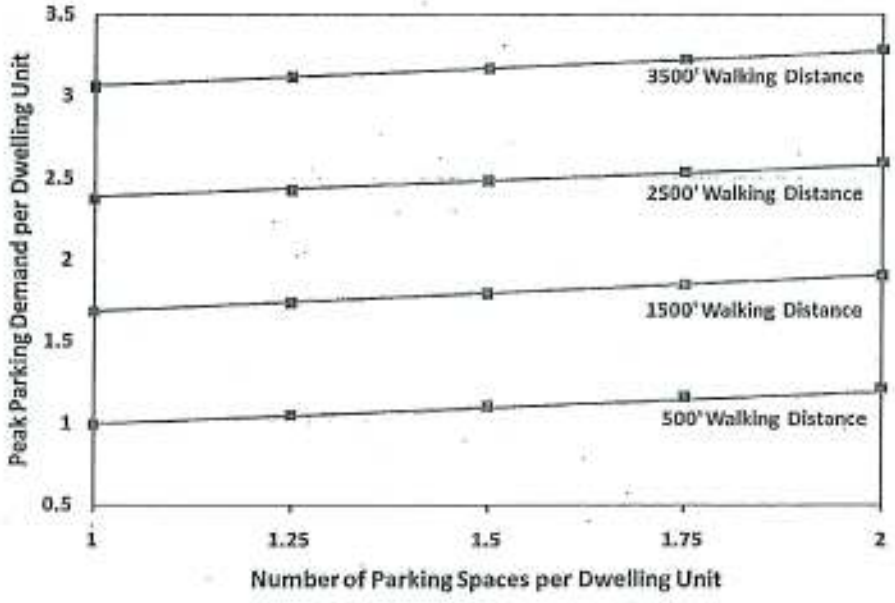


Figure 2. Sensitivity Analysis: Influences of Parking Supplies and Walking Distances on Predicted Peaking Parking Demand

One additional multiple regression equation was estimated to shed light on transit usage among TOD tenants. The dependent variable is off-peak parking demand divided by peak parking demand. A high value denotes that significant shares of tenants are leaving their cars at home during daylight hours and thus presumably commuting by transit—i.e., there are almost as many parked cars in the midday as in the wee hours of the morning. Very low values suggest the obverse: most tenants are driving to work or other destinations.

Numerous available variables were used as candidate predictors; however, as shown by the best-fitting equation in Table 3, only two were reasonably significant: land area and walking distance. The coefficients on both variables are negative, indicating that large, spacious projects far removed from stations were associated with most tenants driving to work—i.e., parking lots tended to empty out during the day.

Table 3. Best-Fitting Multiple Regression Equation for Predicting the Rate of Off-Peak to Peak Parking Demand

	Dependent Variable: Off-Peak Parking/Peak Parking			
	Coeff.	*Std. Err.*	*t Statistic*	*Prob.*
Land Area: Project's land acreage	-0.009	0.003	-2.493	.019
Walking Distance: Shortest distance along sidewalk network from project center to station, in 1000 ft	-0.244	0.000	-1.651	.110
Constant	0.688	0.041	16.766	.000
Summary Statistics: F statistics (prob.) = 6.073 (.006) R Square = .303 Number of Cases = 31				

Case Studies

The previous analysis showed that walking distance and parking supplies were the two most significant predictors of parking generation rates. Several case examples around the Fremont BART Station amplify this point. Projects near the Fremont BART station stand out for their high peak parking rates, ranging from 1.23 to 1.69. Alborada Apartments is notable for having the highest peak parking demand of the entire study. Another site, Archstone Fremont Center, distinguishes itself not because its peak generation is unique (at 1.45, its rate is average for Fremont)

but because its *off*-peak generation is so high. The off-peak parking generation at Archstone was 1.14, the highest of all surveyed projects. That is, almost 80 percent of the cars present in the middle of the night were still there in the middle of the day. Archstone's high ratio (0.78) of off-peak to peak demand indicates that most residents own cars but are not driving for their daily commute. What neighborhood and design features might explain the seemingly high level of car parking and use at the surveyed Fremont projects? Focusing on these two "outlier" cases might shed light on this question.

Fremont Station Area

The city of Fremont was designed for the car (Renne 2009a). Despite the presence of pedestrian and bicycle infrastructure, such as audible pedestrian countdown signals, bike lanes, and wide, shaded sidewalks, it is not an inviting place to walk or bike due to its scale and the vast distances that separate activities. The streets immediately adjacent to the Fremont BART station are quite wide, ranging from 80 to 100 feet, and the blocks are 800-2000 feet long. Over half of the surveyed projects in Fremont are more than 13 acres in size. A block away from the Fremont station lies large office and institutional buildings that turn large blank walls to the sidewalk. Retail stores and eateries are few and far between.

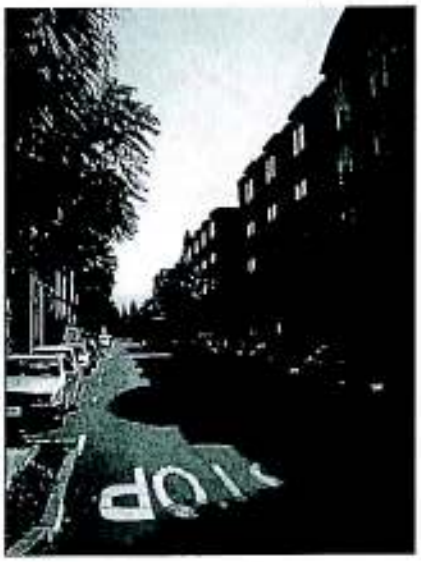
Fremont BART's Archstone and Alborada Projects

A comparison of Archstone and Alborada reveals several salient differences that could explain variations in parking demand. One difference pertains to on-site uses. Ground-floor retail uses at Archstone (a coffee shop, grocery store, and restaurants) enable residents to meet basic daily needs on foot en route to or from the BART station. In contrast, Alborada has no retail on-site or along the walkway to BART. This could partly explain why larger shares of Archstone residents leave their cars at home during the workday—i.e., its relatively high off-peak to peak parking ratio.

Another difference pertains to site design. Both Archstone and Alborada are relatively large complexes, with 323 and 442 units, respectively, but the projects have strikingly different physical forms (Photo 1). Alborada is a garden-style project with individual buildings interlaced by surface parking. It is an insular, gated development, set back from the street and detached from its surroundings. Over 16 acres in size, it averages 27 units per acre. Two-thirds of Alborada's land area is devoted to surface parking and roadways. In contrast, at 54 units and covering only 6 acres, Archstone is more compact, conveying the feeling of an urban place. Cars have

less of a physical presence: podium parking is tucked under four-story residential complexes, with less than half the site devoted to parking and roadways.

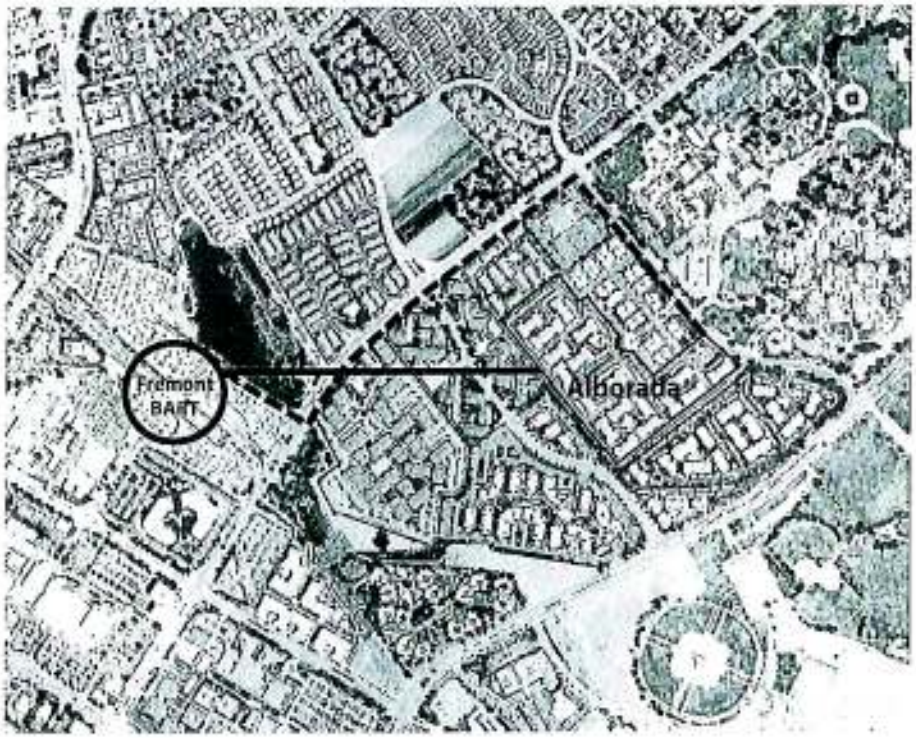
Photo 1. Contrasting Road Designs
Alborada Apartments (above) and Archstone Fremont Center (below)



Journal of Public Transportation, Vol. 13, No. 2, 2010

It is not form alone but also how Alborado's design affects connectivity to BART that likely influences travel choices. Despite Alborada lying within a half mile of BART, the shortest walking route to the station is over a mile (Photo 2). This circuity results from two factors: (1) the entire perimeter of Alborada's16-acre expanse is fenced and the sole gate is at the opposite end from the station; and 2) the sheer size of the development, together with limited access points, inflates walking times to almost anywhere. It takes around six minutes to walk from one end of the Alborada complex to the other. Even Alborada residents who take transit may be tempted to drive to the station when faced with a choice of a two-minute drive or a circuitous 20-minute walk along a route lacking anything of pedestrian interest. The fact that reaching the local BART station is far more convenient by car than foot likely contributes to Alborada's high peak parking rate.

Photo 2. Trip Circuitry
Comparison of shortest walking path to straight-line distance from center of Alborada Apartments project to the Fremont BART station entrance.



In contrast, Archstone Fremont's considerably higher off-peak/peak parking ratio is no doubt partly due to easier foot access. Most Archstone tenants are within 10 minutes of the BART fare gate. This is due partially to the fact that Archstone is closer to BART than Alborada, which, as shown earlier in Table 3, is a significant predictor of this ratio. Additionally, Archstone's proximity is enhanced by the absence of clear borders and fences. The project's smaller scale and grid layout also create a more pedestrian-friendly setting.

In sum, the Archstone and Alborada cases suggest that the presence or absence of mixed uses, direct pathways, and connectedness to surroundings could very well affect how TOD residents use and park their cars. The Quatama MAX station in Beaverton, Oregon , can serve as a model for cities such as Fremont on designing for transit connectivity. There, a walking path provides direct and nicely-landscaped access to the MAX station (Photo 3). The city required the project developer to build the path as a condition of approval. Retrofitting current development with such pathways, while challenging, could improve current pedestrian connectivity, and requiring such pathways in new developments could ensure better connectivity in the future.

Photo 3. Pathway from the Quatama Station toward nearby residences

TOD Parking Ordinances

While our research has found that peak parking levels of housing near suburban rail stops are not significantly below national averages (based on ITE data), we also found that factors such as constrained parking supplies and short walking distances to stations can lower demand. In light of these findings, have cities been responsive through their parking zoning ordinances, making adjustments for projects near rail transit?

National Survey

To probe this question, we conducted a national survey. The sample frame was all U.S. cities with rail transit stations, identified using coordinates from the Center for Transit-Oriented Development station database. From this list of cities, contact information was gathered and an online survey was sent to senior planning staff.

Of the 363 cities surveyed, 22 percent (or 80 in total) returned a completed questionnaire, which is in line with typical response rates for online surveys (Fink 2003). A higher response rate of 40 percent from cities with over 100,000 residents and a 10 percent response rate from cities under 10,000 skewed the sample to an average population of 167,000 versus 144,000 for all cities with rail stops. Ten or more responses were received from cities in metropolitan Los Angeles, San Francisco-Oakland, Chicago, and the Washington-Boston corridor.

Survey Findings

Of the cities surveyed, nearly all (96%) have some form of minimum off-street parking requirement for multi-family housing. Most cities with minimum parking requirements (89%) also allow for variances or exceptions to these minimums. Proximity to rail transit is grounds for a variance in 39 percent of cities that allow variances, which is just over one third of all cities with minimum off-street parking requirements for multi-family housing. Parking space reductions for proximity to rail transit range from fewer than 10 percent to as high as 60 percent, with a mean reduction of 22.8 percent (standard deviation = 13.7%).

Differences by housing type and across locations in a city complicate the ability to quantify a city's average or typical parking requirement. In the interest of obtaining some sort of comparison, we calculated per-unit parking requirements in each city for a hypothetical transit-oriented multi-family housing project located ¼ mile from a rail station using zoning requirement and variance information that was provided. These calculated minimum off-street parking requirements are, of

course, a simplification and likely miss some nuances of applied zoning codes, but they provide a useful tool for comparing requirements across jurisdictions.

The calculated off-street minimum parking requirements for transit-oriented multi-family housing in our sample ranged from 0 to 3 parking spaces per unit for both one and two bedrooms units. The mean across all cities surveyed was 1.37 stalls per one-bedroom unit and 1.61 per two-bedroom unit, both above the ITE per-unit rate of 1.2. If we assume an even mix of one- and two-bedroom units, our average calculated parking requirement for a hypothetical transit-oriented housing project is 1.48 per unit, well above the ITE average of 1.2 per unit and even above ITE's 85th percentile of 1.46 per unit. Put another way, 75 percent of cities surveyed have minimum TOD parking requirements that exceed ITE parking generation rates. Based on both ITE rates and the empirical findings presented earlier, these numbers show that even when cities adjust parking requirements to take transit-proximity into account, far too much parking is required.

Respondents also were asked questions about their views on current parking policies and the willingness of elected officials and developers to support changes to parking requirements. When asked about their city's current minimum off-street parking requirements near rail stops, 59 percent of respondents answered they "are about right"; however, 37 percent replied "too much was being required." When asked about the likely stance of local elected officials to lowering minimum off-street parking requirements for multi-family housing near rail transit, 59 percent of those who responded felt officials would be supportive versus 32 percent who thought they would be opposed. Moreover, among those who recorded a response, 85 percent felt elected officials would oppose efforts to eliminate minimum parking requirements even if a project is near a rail stop. However, 55 percent also believed elected officials would support efforts to set a cap on parking for housing near rail transit.

In general, survey respondents felt housing developers were inclined to provide less parking than necessary. Among those answering the question, 60 percent felt that developers of multi-family housing would build too little parking if given the chance. Just 10 percent felt developers would provide too much parking. The prevalence of high minimum parking requirements likely reflects the public sector's fear that, if left to their own accord, private developers will under-supply parking. Planners fear the resulting spillover will affect surrounding neighborhoods, which was cited by respondents as the number one obstacle to enacting zoning reforms.

Conclusions

This study posed the question: "Are TODs over-parked?" From a design standard perspective, our response is "probably so." For the 31 surveyed multi-family projects combined, there were 1.57 spaces per dwelling unit, nearly one third higher than ITE's suburban standard of 1.2 spaces per unit. From a supply-demand standpoint, transit-oriented housing also seems over-parked: the weighted-average supply of 1.57 spaces per unit was 37 percent higher than the weighted-average peak demand of 1.15 parked cars per unit. From our national survey responses, there is evidence of over-parking: the estimated average minimum parking requirement for multi-family housing near rail transit was 1.48 spaces per unit, also well above the ITE standard. From a pure demand standpoint, however, it appears that peak parking demand for transit-oriented housing aligns fairly closely with the ITE standard. Experiences in the East Bay and Metro Portland suggest that TODs are only slightly over-parked, if at all. In sum, we believe parking supplies are over-inflated, not due to bloated ITE design standards but other factors, such as developers' fears of insufficient parking to attract prospective tenants or local officials' fears of spillover on-street parking problems in surrounding neighborhoods. It is because of such concerns that municipal parking standards for TOD housing appear on the high side, which probably further induces car ownership and usage—i.e., the classical vicious cycle of supply and demand feeding off each other.

We acknowledge that a simple comparative analysis such as ours has limitations and is certainly not the final word on this subject. For this reason, we have refrained from using words such as "caused" or "proved" in describing relationships. The best we can say is that many suburban TODs appear to have more parking than is needed. In truth, "thumbs-up/thumbs-down" decisions on whether to approve proposed TOD projects rely heavily on the kinds of simple comparisons to ITE rates presented in this paper. They certainly are not based on multinomial logit estimates of transit ridership impacts. While we, no doubt, need more sophisticated studies that probe the influences of parking supplies and policies on travel behavior and car ownership, there is also a need for straightforward comparisons of actual and estimated rates to inform TOD design and approval decisions.

While we conclude that transit-oriented housing seems to be mostly over-parked, the research also points to factors that can moderate demand. As expected, supply matters. From our regression estimates, reducing parking by 0.5 spaces per unit is associated with 0.11 fewer cars parked per unit at the peak. Also, parking demand generally fell as the walking distance to a station shortened. Smaller scale projects

with less land coverage also average lower parking rates. These findings favor clustered development with good internal pathways that provide fairly short, direct connections to rail stops. Such designs can shrink parking demand and its footprint, unleashing a "virtuous cycle"—i.e., less land is given over to surface parking which, in turn, allows more compact site designs. Last, the other policy lever to lower parking demand is transit service levels. Our model showed that reducing headways between trains reduces parking loads, ostensibly because one is less in need of a car in areas with superb transit services.

Other policy responses also are supported by our findings. One response should be the introduction of more flexibility in parking policies for housing near rail stops. Flexibility can be in the form of enabling projects to provide below-code parking levels when justified—e.g., compact projects with short, direct walking connections to transit and perhaps on-site retail establishments. In their chapter "Ten Principles for Developing around Transit," Dunphy et al. (2004, p. 174) note that "flexible parking standards provide some latitude in providing the optimal number of parking spaces." Flexibility also can take the form of unbundling the cost of providing parking from the cost of building (or renting) housing (Daisa 2004; Shoup 2005). This would allow developers to better scale the amount of parking provided to what each tenant or homeowner is willing to pay for each car owned—i.e., let the market demand, rather than a possibly outdated government fiat, determine supply. And flexibility can be in the form of allowing TOD tenants to choose deeply discounted transit passes for frequent riders instead of a 300 square foot parking space. Shoup (2005 p. 259) argues that the substitution of such "Eco Passes" for parking among transit-oriented residents could "reduce the cost of TOD, improve urban design, reduce the need for variances, and reduce traffic congestion, air pollution, and energy consumption ... at a low cost."

Our finding that TODs de-generate automobile trips a lot more than they de-generate parking demand, at least relative to ITE standards, suggests TOD residents commute by transit proportionately more than they shed cars. That is, many self-select into TOD neighborhoods for the very reason that they want to avoid congestion and thus take transit to work, but for non-work travel, they still need a car. We believe a significant share of TOD residents would shed a car if they had carsharing options. Cervero et al. (2007) carried out a panel study of how San Francisco's City CarShare program affected car ownership. Four years after the inauguration of City CarShare, 29 percent of carshare members had gotten rid of one or more of their cars, and 63 percent lived in zero-vehicle households. A predictive

model showed that living close to a carshare pick-up spot was strongly associated with car-shedding. By extension, putting shared-cars in and around TODs could relieve many households from owning a second car or a vehicle altogether. Through a combination of proximity advantages and lifestyle predispositions, living near transit can de-generate vehicle trips. And with the option of car-sharing, it can likely reduce parking demands as well.

References

Bernick, M., and R. Cervero. 1997. *Transit Villages for the 21st Century*. New York: McGraw-Hill.

Boarnet, M., and R. Crane. 2001. *Travel by Design: The Influences of Urban Form on Travel*. New York, Oxford University Press.

Cervero, R. 1994. Transit-based housing in California: Evidence on ridership impacts. *Transport Policy* 1(3): 174-183.

Cervero, R. 2001. Walk-and-ride: Factors influencing pedestrian access to transit. *Journal of Public Transportation* 3(4): 1-23.

Cervero, R., and others. 2004. *Transit Oriented Development in America: Experiences, Challenges, and Prospects*. Washington, D.C.: Transit Cooperative Research Program, Report, 102.

Cervero, R. 2007. Transit oriented development's ridership nonus: A product of self selection and public policies. *Environment and Planning A* 39: 2068-2085.

Cervero, R., A. Golub, and B. Nee. 2007. City CarShare: Longer-term travel-demand and car ownership impacts. *Transportation Research Record* 199: 70-80.

Cervero, R., and G. Arrington. 2008. Vehicle Trip Reduction Impacts of Transit-Oriented Housing. *Journal of Public Transportation*, 11 (3): 1-17.

Daisa, J. 2004. Traffic, parking, and transit oriented development. In Dittmar, H., and G. Ohland, eds. *The New Transit Town: Best Practices in Transit-Oriented Development*. Washington, DC: Island Press, pp. 114-129.

Dill, J. 2006. *Travel and Transit Use at Portland Area Transit-Oriented Developments (TODs)*. Seattle: Final Technical Report, Transportation Northwest (TransNow).

Dunphy, R. 2004. Who, What, Where, Why. In DunphyR., et al., eds. *Developing Around Transit: Strategies and Solutions That Work*. Washington, D.C.: Urban Land Institute, Chapter One.

Dunphy, R., D. Myerson, and M. Pawlukiewicz. 2004. Ten Principles for Developing Around Transit. In Dunphy, R., et al., eds., *Developing Around Transit: Strategies and Solutions That Work*. Washington, D.C.: Urban Land Institute, Chapter Seven.

Ewing, R., and R. Cervero. 2001. Travel and the built environment: A synthesis. *Transportation Research Record* 1780: 87-114.

Fink, A. 2003. *The Survey Kit*. Thousand Oaks, California: Sage Publications.

Handy, S. 2005. Smart Growth and the transportation-land use connection: What does the research tell us? *International Regional Science Review* 28(2): 1-22.

Hess, D., and P. Lombardi. 2004. Policy support for and barriers to transit-oriented development in the inner city: Literature review. *Transportation Research Record* 1887: 26-33.

Institute of Transportation Engineers. 2003. *Parking Generation*. Washington: ITE, 3rd Edition.

Karp, J. 2008. Suburbs a mile too far for some. *Wall Street Journal*, June 17, 2008, A18.

Loukaitou-Sideris, A., and T. Banjaree. 2000. The blue line blues: Why the vision of transit village may not materialize despite impressive growth in transit ridership. *Journal of Urban Design* 5(2): 101-125.

Lund, H., R. Willson, and R. Cervero. 2006. A re-evaluation of travel behavior in California TODs. *Journal of Architecture and Planning Research* 23(3): 247-263.

Poticha, S., and J. Wood. 2008. Transit oriented for all: Delivering mixed-income housing in transit served neighbourhoods. In Curtis, C., et al., eds., *Transportation Oriented Development: Making It Happen*. Surrey, England: Ashgate, 153-169.

Renne, J. 2009a. From transit-adjacent to transit-oriented development. *Local Environment* 14(1): 1-15.

Renne, J. 2009b. Measuring the success of transit oriented development. In Curtis, C., et al., eds., *Transportation Oriented Development: Making It Happen*. Surrey, England: Ashgate, pp. 241-255.

Shoup, D. 2003. Truth in transportation planning. *Journal of Transportation and Statistics* 6: 1-16.

Shoup, D. 2005. *The High Cost of Free Parking*. Chicago: Planner's Press.

Urban Land Institute. 2004. *Emerging Real Estate Markets: 2004*. Washington: ULI.

Willson, R. 2000. Reading Between the regulations: Parking requirements, planners' perspectives, and transit. *Journal of Public Transportation* 3(1): 111-128.

About the Authors

Robert Cervero (robertc@berkeley.edu) is professor of City and Regional Planning at the University of California, Berkeley, where he also directs the Institute of Urban and Regional Development and the University of California Transportation Center (UCTC).

Arlie Adkins (adkins@pdx.edu) is a recent graduate in City Planning at the University of California, Berkeley and is currently enrolled in the doctoral program in Urban Studies at Portland State University. He previously worked as a transit planner with Portland's TriMet.

Cathleen Sullivan (cathleenscottsullivan@gmail.com) just completed a Masters in City Planning at the University of California, Berkeley. She now works as a transportation planner for Nelson\Nygaard Consulting Associates in San Francisco.

San Francisco Planning + Urban Research Association
a member-supported nonprofit organization

SPUR IDEAS AND ACTION FOR A BETTER CITY

ARTICLE
This article appears in the September 2009 issue of the Urbanist

Job sprawl in the megaregion

How can we slow the decentralization of work in Northern California?

Of the nearly 60 Fortune 1,000 companies in Northern California, only one-third of them are based in our megaregion's central cities of San Francisco, San Jose, Sacramento and Oakland. This sprawling pattern of job growth poses great challenges as the boundaries of the megaregion expand outward, resulting in unsustainable commute patterns and increased levels of greenhouse gas emissions. While many key industries of our megaregion's economy are now based in these car-oriented suburbs, this sprawling pattern of employment must change if we wish to meet regional and statewide targets for addressing climate change.

In particular, the recent California state Senate bill 375 aims for transportation planning that reduces driving through better-coordinated land use planning. While the bill specifically discusses planning for housing, it is just as important for employment. We will not be able to reduce daily driving unless we investigate the matter of where jobs are located, and develop effective strategies to shift more work to locations that can be served by regional public transit.

In addition to its impact on the environment, the location of jobs is a key variable in the economic competitiveness of our regional economies. Long commutes on congested freeways reduce productivity. The spread-out pattern of work makes job access a challenge for people in lower-income households, who have fewer choices of where to live. Yet dense employment districts benefit employers as they share ideas, workers and clients. Proximity to other businesses — particularly in related industries — is an important factor in a firm's competitiveness. This is best achieved when jobs and businesses are concentrated into centers.

This article outlines the problem of job sprawl, and offers a framework to address it. Our overall goal is to slow the continued outward growth of jobs from already developed employment centers, and to shift more commuters — wherever they work — into sustainable commute modes. We propose a four-part land-use solution to:

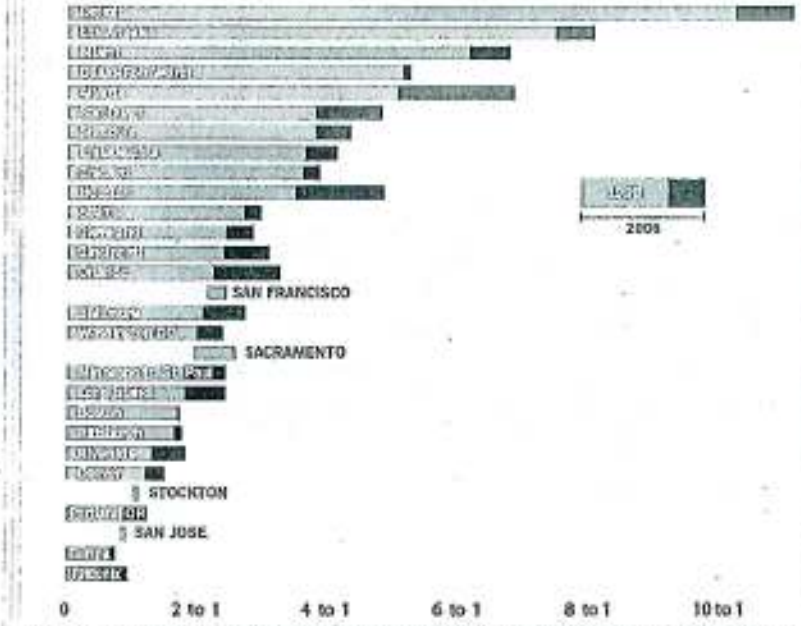
1. **Shift more work back into traditional transit-served downtowns,** such as the central business districts in San Francisco and Oakland.[1]
2. **Concentrate more employment at suburban transit stations** in "edge cities" such as Walnut Creek, Concord, Sunnyvale and Mountain View.
3. **Remake existing low-density office parks** and scattered office buildings along highway corridors into higher density employment districts with the potential to be served by transit.
4. **Reform the self-enclosed, car-oriented corporate campus** into a more sustainable model that may include increasing employment density while also bringing in other uses,

additional shuttles and new transit.

Achieving these four goals requires policy interventions that shift the incentive structure for employers, developers and individual commuters.

Ultimately, we envision a polycentric megaregion where the various employment centers serve different roles, yet are all connected in a transit network. The shifting of work to transit-served areas reinforces each center (including the traditional downtown) as more businesses become connected to each other. This vision recognizes the multi-centeredness that is a permanent feature of our megaregion, but tries to reshape this geography for a 21st century in which non-driving alternatives are increasingly important.

JOB GROWTH AT THE URBAN/SUBURBAN EDGE, 1998 AND 2006



Source: Kneebone, Elizabeth. "Job Sprawl Revisited: The changing geography of metropolitan employment." Brookings, 2009.

This graph is a jobs index comparing the jobs located more than 10 miles from CBDs to jobs located within three miles of CBDs. The dark blue sections show the difference in this ratio between 1998 and 2006. (For instance, the ratio for Phoenix is 1:1, meaning Phoenix experienced 100 percent more growth at its urban boundaries than it did in its city center.) The lightest areas show the values for cities within the Northern California megaregion.

WHAT IS JOB SPRAWL?

Over the past few decades, employers have followed residents to the suburbs as the share of jobs in central cities has declined. In fact, most workers now live in one suburb and work in another, rather than commute back to the city. This process of job decentralization is the key factor that has facilitated job sprawl.

Yet what we call "job sprawl" is simply the spread-out organization of work into locations where the density is too low or that are too poorly designed to be effectively served with transit. As a result, the vast majority of commuters drive to work. Put most simply, the primary problem with job sprawl is that as work decentralizes, it puts more jobs in non-transit-served locations and means most commuters are unable to access work without a car.[2]

By contrast, when most jobs are in the core of a region, the "commute shed" — or the geographical area from which a region's commuters originate — is fairly contained, and a higher percent of all commuters have overlapping commutes. Not only do most commuters live within a reasonable distance of their job (a commute of approximately 30 minutes), but many of them also have similar commutes, thus making transit investments highly effective.

But as more jobs move to the suburbs, each new job site has its own distinct commute shed. Suddenly, a "reasonable" 30 minute commute to this new suburban location can include a much more remote community now at the edge of the region. Because many of the edge communities have few economic development options, they often have city councils that are distinctly pro-growth and therefore willing to accept any development. In a region such as the Bay Area, where many of the core communities are generally anti-growth, pressure at the edge becomes even more intense. For example, as more work shifted to Concord and

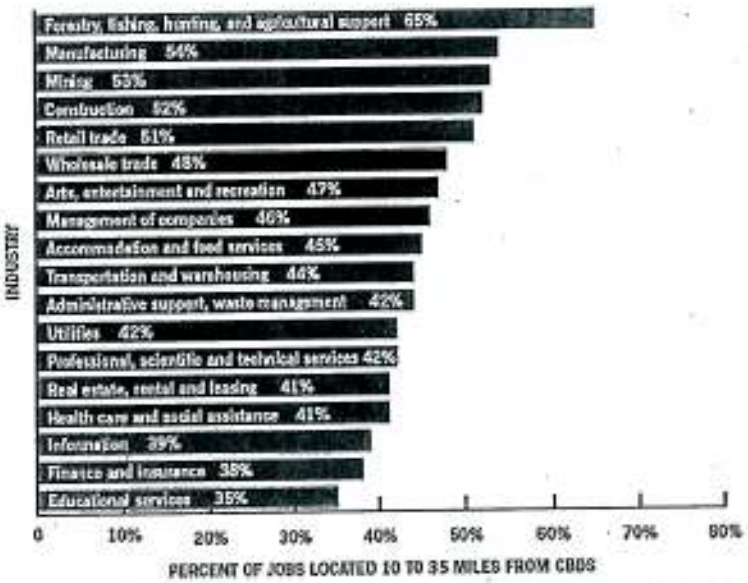
Livermore in the East Bay, commutes from places such as Brentwood, Antioch and Tracy became much more reasonable. The same holds true for job-rich Sacramento suburbs such as Rancho Cordova and Roseville, which makes living in the Sierra foothills viable.

Yet it is not the outward movement of jobs alone that is the problem. Instead, it is the disorganized, low-density form of employment that forces most people to use a car to make the trip between home and work. The more job locations there are, the harder they will be to serve efficiently with transit, particularly when the region's commute patterns begin to look more and more like a spider web. In this situation, the most effective way to get from one place to another (or from home to work) is the private automobile. Public transit can almost never work where job density is too low and the residential origins are too scattered.

Over time, this process becomes self-reinforcing. As more jobs move to the suburbs, the commute sheds become more stretched out, and the edge sprawls farther out into farmland or natural habitats. And as workers increasingly move farther toward the edge of the megaregion, more employers will follow them and continue to perpetuate this cycle.

Today, the suburbanization of work is now a key driver of residential sprawl as the commute shed defines the edge or boundary of a megaregion. Reversing residential sprawl necessitates stopping job sprawl. Yet with more than half the U.S. population now working in the suburbs, stopping job sprawl is no longer about limiting the movement of work to the suburbs, but instead about reorganizing work within the suburbs to better meet the needs of a sustainable region.

U.S. JOBS (BY INDUSTRY) LOCATED FURTHEST FROM CENTRAL CITIES



Source: Kneebone, Elizabeth. "Job Sprawl Revisited: The changing geography of metropolitan employment." Brookings, 2009.

Many of the jobs facing the highest decentralization rates nationally are key industries in the Northern California megaregion. For some industries, such as transportation and warehousing, decentralization is not surprising. But why are industries such as management, information and education moving away from central cities?

WHY JOB SPRAWL IS GETTING WORSE

As evidence that job sprawl is getting worse, we analyzed three trends: the decentralization of jobs, declining transit commute patterns, and increasing congestion and vehicle miles traveled.

Trend #1: There has been significant increase in job growth outside traditional downtowns

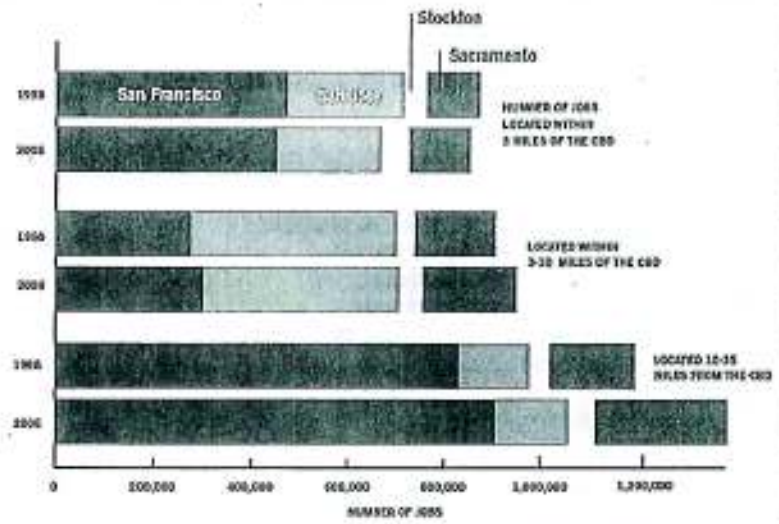
Since the 1990s, the share of jobs located within three miles of central business districts has steadily declined. Based on an analysis of the decentralization of work from the four central business districts or primary downtowns of Northern California (San Francisco, San Jose, Sacramento and Stockton) during the eight-year period between 1998 and 2006, these CBDs experienced a net loss of more than 22,000 jobs, while jobs located 10 to 35 miles from these CBDs increased by more than 225,000.

Nationally, job growth out from the center has become a significant trend. Of metropolitan areas with more than 900,000 jobs within 35 miles of the central business district, all have

experienced a decline in the share of jobs within three miles of the CBD and an increase in jobs 10 to 35 miles from the CBD.

Also, the rates at which jobs move outward in certain industries in the United States are increasing. Nationally, some of the most rapidly decentralizing industries are the same industries that are most important to the Northern California economy, and particularly to its traditional central business districts. Industries such as management, information services and education are experiencing the greatest share of relocation to areas 10 to 35 miles from CBDs. While it may not be surprising that manufacturing, transportation and warehousing are moving out into the suburbs and beyond, the trend of less cost-sensitive industries (for instance, knowledge services such as management of companies and finance) moving out poses yet another challenge for traditional downtowns, given that these are industries where the CBD is also most competitive. For example, nationally, 46 percent of jobs in "management of companies" and 42 percent of jobs in professional, scientific and technical services are located 10 miles or more from a traditional CBD.[3]

SHIFTS IN THE LOCATION OF JOBS IN THE NORTHERN CALIFORNIA MEGAREGION



Source: Kneebone, Elizabeth. "Job Sprawl Revisited: The changing geography of metropolitan employment." Brookings, 2009.

Over the last 8 years, central business districts in Northern California have lost over 22,000 jobs. Meanwhile the number of jobs located 10 to 35 miles from the CBDs has increased by over 225,000 (that's more than half the number of jobs in downtown San Francisco).

Trend #2: The number of commuters who drive alone to work has increased dramatically.

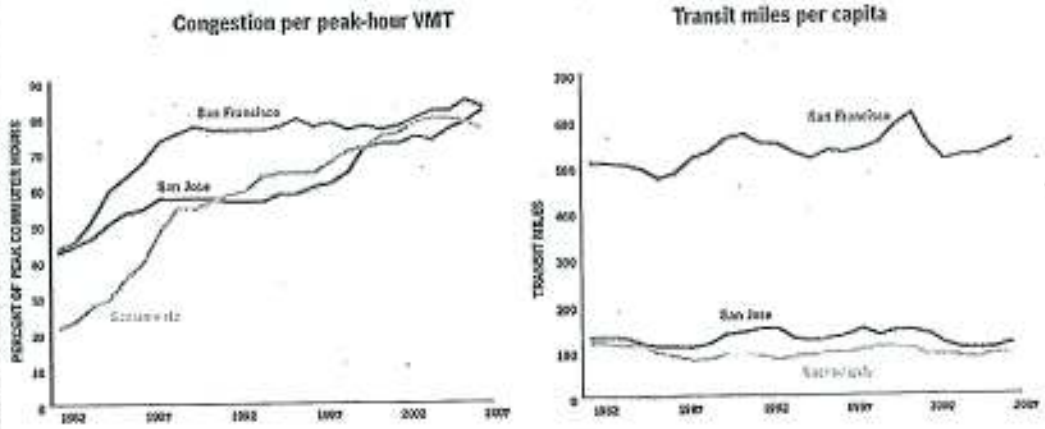
The share of commuters in the Northern California megaregion who drive alone to work has been increasing since the 1980s. Even in San Francisco, where transit ridership is historically and significantly higher than elsewhere in the megaregion, the share of commuters who drive alone has grown. This increase is in part due to the movement of jobs from urban cores to suburban office parks that are not as easily accessible to transit. It is also due to the growing number of professionals living in San Francisco and commuting to information and technology jobs in the Peninsula and South Bay.

Among counties in the Northern California megaregion, San Joaquin County in the Central Valley and San Benito County south of Santa Clara County stand alone in experiencing a decline in the share of drive-alone commuters — due in no small part to the advent of transit access in these areas. San Joaquin County saw a significant increase in transit ridership following the 1998 creation of the Altamont Commuter Express, which links Stockton to San Jose with daily rail service. San Benito County also experienced an increase in the number of commuters who use transit to get to work, once Caltrain was extended to Gilroy in 1992 and transit from San Benito County to the station was introduced. This suggests that improving transit access to areas where it previously did not exist can have significant impacts on commuter travel behavior.

Despite the increase in drive-alone rates, there is hope. More than 30 percent of commuters who live within half a mile of a regional rail station take some form of public transportation to work. Improving transit access for commuters, on both the home and work trips, can have major impacts on traffic congestion, the number of vehicle miles traveled, and greenhouse gas emissions throughout the megaregion.

Trend #3: There has been a rise in VMT and traffic congestion across the megaregion. The spreading of jobs across the megaregion has led to major increases in daily freeway vehicle miles traveled, the percent of commutes spent on congested roadways, and the personal cost of congestion that those who drive alone to work must bear. In 1982, only 35 percent of peak hour travel in the megaregion was congested. Today, that number is closer to 80 percent. Congestion costs each peak hour traveler more than $1,000 a year in wasted time, fuel and resources. As jobs continue to move farther away from both central business districts and transit nodes, this trend is only going to get worse.

TRANSIT OR TRAFFIC: HOW HAVE COMMUTES IN NORTHERN CALIFORNIA CHANGED?



Source: Texas Transportation Institute, "Urban Mobility Information: 2009 Annual Urban Mobility Report," Texas A&M University, 2009.

Increasing congestion has been a consistent feature in Northern California commutes. Not surprisingly, the total transit ridership per capita has scarcely changed. With future population growth, just maintaining our current high levels of congestion will require shifting many more people and jobs to places served by transit.

HOW TO SOLVE JOB SPRAWL

While reinforcing traditional downtowns is a key goal of the megaregional planning agenda, suburban job locations increasingly are a part of our economic landscape and thus invariably a part of the solution. Job sprawl cannot be stopped or reshaped without acknowledging this and finding a way to make more suburban jobs transit-accessible.

We propose four solutions:

1. **Put more jobs into existing transit-rich downtowns.**
2. **Shift more work to suburban transit-served employment centers,** often in or near "edge cities."
3. **Remake multi-tenant suburban office parks** and scattered office buildings along highways corridors (our "edgeless cities") into more clustered, transit-served destinations.
4. **Redesign the corporate campus** to accommodate significantly more work and to further reduce drive-alone rates.

All four of these land-use approaches are necessary to reduce the harmful impacts of job sprawl. But each also has limitations.

Solution #1: Put more jobs into existing downtowns with high transit ridership. First, the simplest solution is to create more jobs and encourage more businesses to be situated in downtowns that already have high transit ridership, mixed uses, mobility and infrastructure. This was the argument SPUR made in its "Future of Downtown" policy paper. In Northern California, San Francisco and Oakland are the best examples of downtowns with healthy transit ridership: San Francisco has more than 50 percent and Oakland around 24 percent. Downtown Sacramento and San Jose trail significantly, but are ideal places to add jobs, particularly because both are investing heavily in transit and asserting themselves as the economic and cultural centers of the surrounding areas.

The key to making this model work is the right combination of transit infrastructure, market-based parking pricing, good urban design, a well-maintained pedestrian environment and, depending on the city, the overcoming of other non-physical business-climate issues — such as perceptions about Oakland's public safety or San Francisco's costs.

This approach is easier said than done.[4] It is very rare in American urbanism to successfully restore a continuous pedestrian fabric to central city landscapes that have already lost their

historic buildings and replaced them with blank facades and surface parking lots, but that is the ambitious planning agenda we call for. This approach also requires significant investment in peak-hour transportation infrastructure, keeping in mind that it is generally less costly than the auto-centric infrastructure required by other employment models. The successful central business district model of good transit and a pedestrian environment with limits on parking is the most successful and proven way to get commuters out of their cars.

While some may argue that the idea of shifting more jobs back downtown is an attempt to return to the pre-automobile pattern of the early 20th century, when each region had a more monocentric form with a single large downtown, our notion actually is more of an acceptance of the polycentric form of the contemporary region. Given the three types of downtowns considered in this essay, the solution of adding more jobs to downtowns results in a widely differentiated set of transit-served downtowns that range from Oakland to Berkeley to San Mateo to San Rafael.

But today, this model must coexist with other ways of organizing work.

Solution #2: Channel more suburban jobs into transit-served nodes and edge cities.
The second-best locational solution to job sprawl is to shift more employment adjacent to rail or regional transit stations in the suburbs. Suburban transit-oriented development nodes are emerging and have created the foundation for increased transit commuting to suburban job destinations. This can be achieved through a variety of strategies, such as building on surface parking lots next to stations, rezoning nearby areas and reworking the street grids, and ultimately by influencing more businesses to locate near these established nodes.

There are some drawbacks to the suburban transit-oriented development approach. Even a successful suburban job center likely will not approach the density levels of a traditional downtown, and thus it will be hard to achieve high transit ridership. Further, commuters will be coming from scattered places, thus making it easier and faster to go from home to work via car, even if work is at a suburban TOD. Ultimately, the level of transit ridership to these places will be based on the availability and price of parking at the job center, the pedestrian experience from the station to work, and the density and transit accessibility of the commuters' homes.

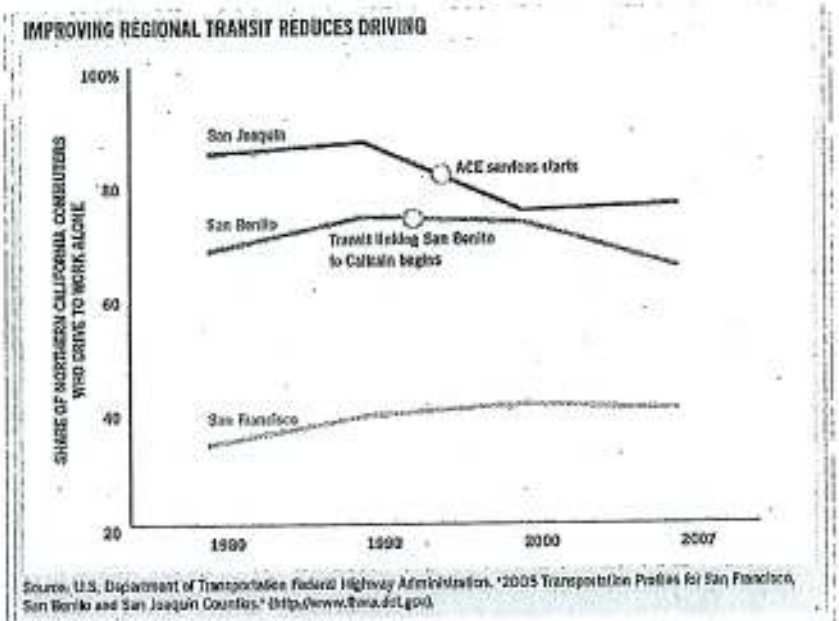
Solution #3: Create denser suburban job corridors.
The third locational solution is to remake existing car-oriented employment centers. These places are the low-density office, lab, retail and industrial spaces that spread along or near highway corridors and proliferate throughout suburbia. The places include buildings such as the Zhone headquarters along I-880 or Vacavalley Business Park. These edgeless areas are the hardest to address, in fact, because their employment densities are low and their employees are spread out. Additionally, in some places the land values are low, thus making it harder to increase densities.

Some of these edgeless cities do not have any rail transit today, but may be getting close to appropriate levels to support it. According to a well-known 1977 study, 6,000 people per square mile is the minimum residential density necessary to support rail investment.[6]

Solution #4: Reimagine the corporate campus.
The fourth locational solution is about remaking the traditional corporate campus, which is typically a relatively dense job center with a single tenant. There are several ways to accomplish this. First, there should be an expansion of the successful shuttle programs of employers such as Genentech, Apple and Google. For example, as many as 50 percent of workers employed at these companies (who live in San Francisco) take shuttles to work. This rivals the share of commuters taking transit to downtown San Francisco.

Second, there should be an increase in the number of jobs at each campus by building on the seas of parking and landscaping that surround existing buildings. With less parking, companies could begin to charge for parking and provide the revenue to transit commuters. Less parking and landscaping is also a cost-saver to the company. As employment density increases over time, new transit could be brought to the campus.

Third, the self-enclosed design should be opened and better integrated with the surrounding community. University campuses remain places of innovation and intellectual protection while also being more open to outsiders. This remaking of the campus could also involve integration of other uses such as retail and even housing to the campus and the areas immediately around it.



Source: U.S. Department of Transportation Federal Highway Administration. "2005 Transportation Profiles for San Francisco, San Benito and San Joaquin Counties." (http://www.fhwa.dot.gov).

The number of Northern California commuters who drive alone to work has been steadily increasing since the 1980s, except in areas where regional transit access has been improved. For example, after the creation of the Altamont Commuter Express (ACE), transit ridership in San Joaquin county rose by 1,137 people daily. Similarly, when Caltrain was extended to Gilroy in Southern Santa Clara County — with shuttles linking San Benito to the station — ridership in San Benito jumped from 302 to 2,248 commuters per day.

CONCLUSION

As this article argues, solving job sprawl does not involve a single approach. We live and work in a polycentric region with a wide range of employment locations, each with a slightly different opportunity to capture future job growth. We also cannot be naïve and assume that the traditional central business districts will regain a majority share of regional jobs, even if this would be the most effective strategy to reduce overall driving. But we certainly can push to make sure that employment throughout the region shifts to more appropriate places. This strategy is the only viable approach to solving the worsening challenge of job sprawl, which in turn is one of the major causes of residential sprawl. Over the next year, SPUR will explore this issue further, refining its approach and developing policy solutions. If we are serious about stopping sprawl, we need to be just as focused on jobs as we are on housing. ❋

ENDNOTES

[1] See "Recentering Work: The Future of Downtown San Francisco," March 2009, where we argued for channeling job growth into transit-rich cores, like downtown San Francisco.

[2] We are focused primarily on office sprawl. While many jobs in an economy do not require offices (retail, distribution, construction, production, etc.), the majority of work in the megaregion is directly tied to an employment center that is primarily a collection of office buildings.

[3] Kneebone, Elizabeth. "Job Sprawl Revisited: The changing geography of metropolitan employment." Brookings, 2009.

[4] An example from the City of Oakland demonstrates the challenge of increasing parking prices. When prices were raised to help fill a budget hole, local businesses staged a strike by shutting down their businesses, thus forcing the City Council to reverse the parking rate increases indefinitely. While well intentioned, this approach of ramping up parking costs can backfire if residents and local business owners perceive the increase to be more about paying local salaries and less about managing congestion or ensuring that there is always a free parking space. Reversing a poorly executed increase in parking prices can push back an improvement to parking management for years.

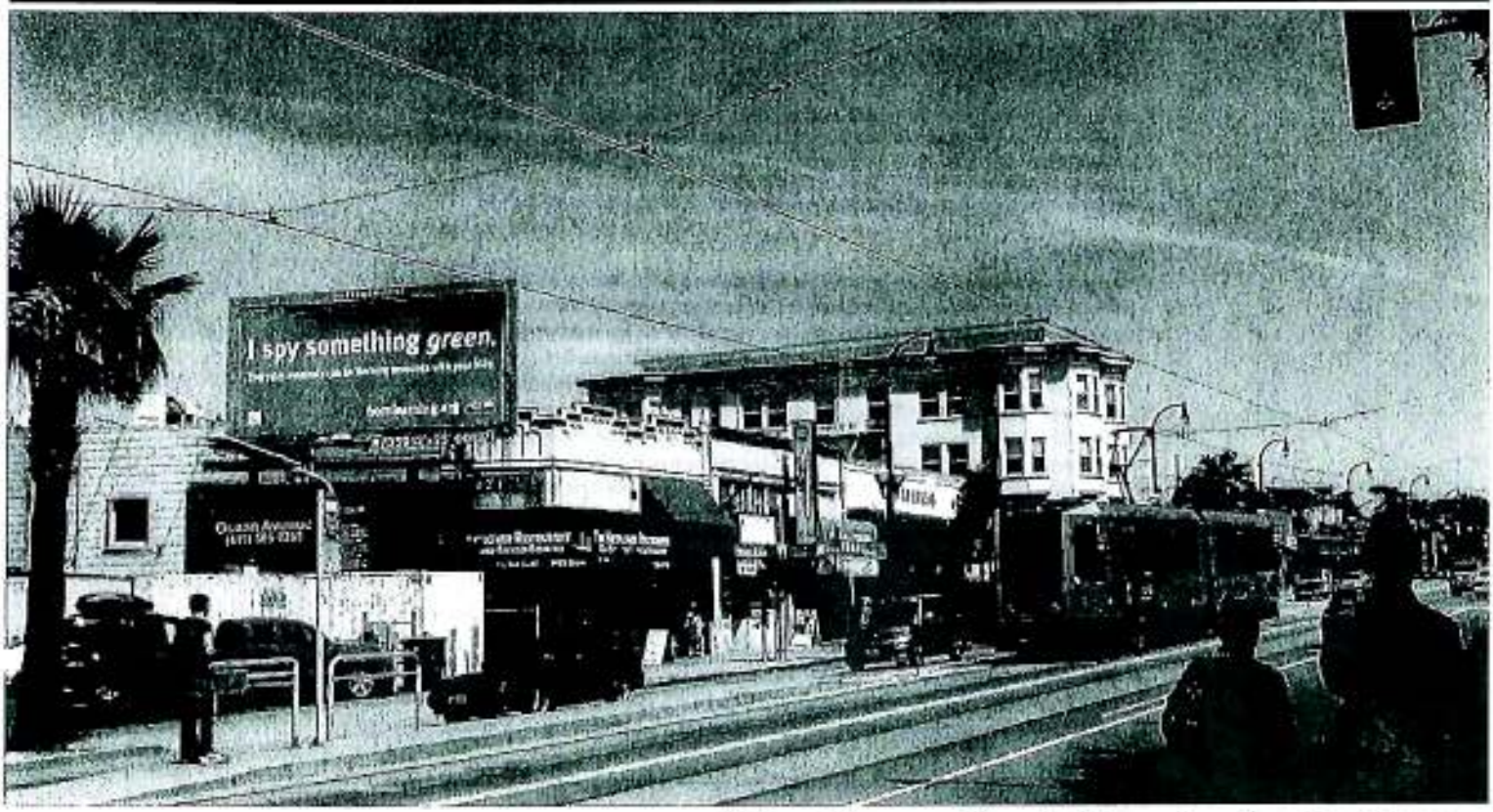
[5] See: Pushkarev, Boris S. and Zupan, Jeffrey M. Public transportation and land use policy, 1977.

ABOUT THE AUTHORS

Egon Terplan is SPUR's regional planning director. Graduate students Shelma Jun and Lesley Miller, and Ph.D. candidate Bige Yilmaz, assisted in research and writing for this article.
Research for this article was funded with generous support from the Clarence E. Heller Foundation and the Wallace A. Gerbode Foundation.

Transit-Oriented for All:

The Case for Mixed-Income Transit-Oriented Communities in the Bay Area



A Great Communities Collaborative Framing Paper

RECONNECTING AMERICA
CENTER FOR TRANSIT-ORIENTED DEVELOPMENT

CENTER FOR COMMUNITY INNOVATION

NPH
THE NON-PROFIT HOUSING ASSOCIATION OF NORTHERN CALIFORNIA

VII. Lessons for Moving Forward

The preceding case studies, and other research to date, offer helpful lessons for achieving mixed-income transit-oriented development (TOD) in the Bay Area.

Lesson 1: Context is key.

Mixed-income TOD can occur in different contexts. But the challenges and tools associated with achieving mixed-income TOD vary considerably from setting to setting. In some mixed- or low-income communities, for example, efforts to promote mixed-income TOD may include strategies to preserve existing affordable housing. In predominantly high-income communities, the emphasis may instead be on new affordable housing development.

Ultimately, identifying the right tools in each setting depends on assessing a variety of factors, such as:

- **neighborhood demographics and housing stock characteristics** (traits can signal a community's vulnerability to displacement such as the relative proportion of renters versus homeowners, the quality and age of the housing stock, and the condition/extent of locally available, permanent affordable housing);
- **location, type and size of development opportunities** (e.g. vacant vs. underutiltized land);
- **local and regional real estate market conditions** (e.g. sales price trends, turnover activity);
- **the relationship between the neighborhood and the region** (e.g. distance to employment centers);
- **station area land use patterns**; and
- **the dynamics of neighborhood change** (e.g. is the community becoming less or more segregated).

In a predominantly low-income transit district where housing oriented to higher-income households is needed to increase income diversity, the community may experience conditions (such as real estate price appreciation) that may potentially displace existing nearby renters. In predominantly high-income communities, the challenges are different. Such communities may show intense resistance to affordable housing, creating a need for tools that enable inclusion of affordable housing in otherwise high-priced markets. Careful research and analysis of a given station area are needed to match the right tools for mixed-income TOD to local and regional conditions.

Lesson 2: Think comprehensively about the transit district.

It is important to think about TOD as a District, not just a Development, when working to achieve mixed-income TOD. New development will impact the half-mile-radius district surrounding a station. What will that impact be? How will new housing relate to the old? Are there social seams in place that could create opportunities for integration? Does the district exhibit housing or demographic characteristics that suggest significant vulnerability to gentrification? To fully understand the design and development choices that will impact the potential for mixed-income TOD, it is necessary to think about TOD at the ½-mile-radius scale.

Lesson 3: Think comprehensively about housing affordability.

There are multiple ways to enable households at a range of income levels to find quality affordable housing in transit districts. They include, but are not limited to:

- constructing new affordable housing;
- acquiring low-priced housing and making it permanently affordable;
- programmatic strategies that induce greater private investment in existing, substandard, affordable housing;
- policies (including zoning) that protect or permit a diversity of housing unit types; and
- targeted assistance to help households afford existing housing (e.g. location-efficient mortgages).

In some situations, where a community is vulnerable to displacement, affordable housing retention can be as important as new affordable housing development. In fact, preservation may actually be more efficient, as studies have found that the cost for rehabbing and preserving existing affordable units is typically 30-50 percent of the cost of building new units.[74]

Rehabilitation itself can be approached in multiple ways– from self-sustaining code enforcement programs to targeted home improvement loans that can replace predatory lending as a source of assistance to owner-occupants who want to upkeep their homes.

Finally, efforts to facilitate new affordable housing construction can take many forms, including:

- mixed-income housing;
- stand-alone affordable housing development;
- regulatory assistance (e.g. lower parking requirements) to help with the high costs of developing affordable housing; and

---

[74] Center for Transit-Oriented Development, *Finding the Balance: A Look at Regional Efforts to Create Mixed-Income Communities Near Transit*, HUD/FTA, 2007 (forthcoming).

- financial assistance (e.g. land acquisition support) to help with the high costs of developing affordable housing.

Lesson 4: There are multiple ways to locate affordable housing.

Affordable housing can be located in mixed-income buildings, in separate buildings featuring different product mixes and prices, or in separate developments altogether. In some settings, where 100-percent-affordable projects can still be integrated into the larger transit district, "stand-alone" projects may be worth serious consideration. Presently, leading sources of affordable housing subsidy – such as the Low Income Housing Tax Credit and the California Multi-Family Housing Program (MHP) – make it harder to finance projects that mix subsidized and un-subsidized units than 100 percent affordable developments. Consequently, stand-alone projects can often generate a greater yield of affordable units than market-rate buildings with inclusionary units, ultimately making a bigger impact on overall income diversity in the transit district. San Mateo's Bay Meadows is an example of this.[75]

Lesson 5: Healthy mixed-income neighborhoods involve a spectrum of incomes.

Achieving full income diversity in the Fruitvale and Bay Meadows transit districts would require additional "affordable" and "market-rate" housing, given the shortage of housing options for certain income brackets above and below the area median. But developers in the Bay Area are not presently producing housing options tailored to a full spectrum of incomes. Housing production has been more slanted toward households earning between 50 and 80 percent of median, and those earning greater than 120 percent of median. The challenge is for transit-oriented development to reach the very-low (<50% of AMI) and moderate-income (80-120% of AMI) households that have been left out of housing production in the Bay Area more generally.

Lesson 6: Early, proactive planning is needed to sustain mixed-income communities.

There are many mixed-income neighborhoods in the Bay Area, but preserving income diversity in a specific location, particularly one such as Fruitvale that has begun to maximize its transit asset, requires intentionality. Planning is the process through which cities and the private sector can collectively take a comprehensive view, and in turn develop tools for a mixed-income community that are appropriate for a given transit district. The most critical intervention is to create permanently affordable housing units, but another valuable approach is supporting social seams, such as diverse retail corridors and community spaces, and even simply allowing

[75] Another good example is Oakland's Uptown project, located less than a quarter mile from the 19th Street BART Station.

some neighborhood barriers or edges to remain. Early upfront planning is especially useful, as it can allow a community to develop tools needed to keep a community inclusive before new development, transit enhancements and other investments begin to affect market dynamics and constrain choices.

Now is the time to plan for mixed-income transit-oriented communities. As the region becomes more segregated, Bay Area stakeholders risk being unable to offer the benefits of transit to low-income groups. Fortunately, recent experiences developing transit-oriented communities offer us lessons that will help us create and preserve mixed-income communities into the future.

NORTHERN NEWS

A publication of the Northern Section of the California Chapter of APA

JULY / AUGUST 2010

Links to articles in this issue:

Local aging-friendly policies and programs in the San Francisco Bay Area

By Amanda J. Lehning, Ph.D., School of Social Welfare, University of California, Berkeley

Background. In recent years a growing number of international, national, state, and local initiatives have started working to make existing communities more aging friendly. This interest in changing the physical and social environment of communities to improve the health and well-being of older adults and help them age in place is a reaction to a confluence of factors, including the aging of the U.S. population, a projected increase in disability and chronic disease in future cohorts of older adults, and an inadequate long-term care system.

Aging-friendly communities share three characteristics:

1. Individuals can continue to pursue and enjoy interests and activities;
2. Supports are available so that individuals with functional disabilities can still meet their basic health and social needs; and
3. Older adults can develop new sources of fulfillment and engagement (Lehning, Chun, & Scharlach, 2007).

This study explored 1) the extent to which cities, counties, and transit agencies in the San Francisco Bay Area have adopted aging-friendly policies, programs, and infrastructure changes in the areas of community design, housing, transportation, health care and supportive services, and opportunities for community engagement, and 2) the diffusion factors, community characteristics, and government characteristics associated with such adoption.

While recognizing that the needs of older individuals and their communities produce variations in the strategies employed to create more aging-friendly communities, recent research studies by AARP's Public Policy Institute (2005), Hanson and Emlet (2006), and National Association of Area Agencies on Aging (N4A) and Partners for Livable Communities (2005) suggest an emerging consensus on the components of an aging-friendly community. This study explored twenty-two policies, programs, and infrastructure changes that fall within five domains, including:

- ***Community design:*** incentives for mixed-use development and infrastructure changes to create walkable neighborhoods;

(continued on next page)

BOARD MEMBER DIRECTORY

Director		
Darcy Kremin, AICP	(925) 988-1278	dkremin@emkc.com
Director Elect		
Hanson Hom, AICP	(408) 730-7450	hhom@ci.sunnyvale.ca.us
Immediate Past Director		
Juan Borrelli, AICP	(408) 535-7709	juan.borrelli@sanjoseca.gov
Administrative Director		
Allen Tai, AICP	(408) 975-2544	allen.tai@sanjoseca.gov
Treasurer		
Jeff Baker	(925) 833-6610	jeff.baker@ci.dublin.ca.us
AICP Director		
Don Bradley, AICP	(650) 592-0915	dc.donbradley@comcast.net
Awards Program Directors		
Andrea Ouse, AICP	(650) 985-2590	andrea.ouse@lsa-assoc.com
Eileen Whitty, AICP	(510) 287-1109	ewhitty@ebmud.com
CPF Liaison		
Hing Wong, AICP	(510) 464-7966	hingw@abag.ca.gov
Ethics Review Director		
Colette Meunier, AICP	(707) 748-4453	Colette.Meunier@crimsonpine.com
International Director		
Rob Eastwood, AICP	(408) 299-5792	rob.eastwood@pln.co.santa-clara.ca.us
Legislative Director		
Bryan Winter, AICP	(925) 943-5800	winter@walnutcreek.org
Membership Director		
Brenna Moorhead, AICP	(415) 774-2972	bmoorhead@sheppardmullin.com
Planning Commissioner		
Margaret Kavanaugh-Lynch	(510) 227-9995	mkavlyn1@gmail.com
Planning Diversity Director		
Connie Galambos Malloy	(510) 839-9505	connie@urbanhabitat.org
Planning Diversity Associate Director		
Mirao Desai, AICP	(510) 596-3785	mdesai@ci.emeryville.ca.us
Professional Development Directors		
Christina Ratcliffe, AICP	(510) 666-7097	christina@ratcliffe.net
Tania Sheyner, AICP	(415) 896-5900	tsheyner@esassoc.com
Student Representatives		
Kim Lucas	(540) 270-7572	kimlaca@gmail.com
Justin Meek	(831) 427-9171	justin.meek@gmail.com
University Liaison		
Emy Mendoza	(510) 326-1919	emysendoza@earthlink.net
Co-Webmasters		
Pierce Macdonald	(510) 459-6092	piercesac@hotmail.com
Raquel Pantoja	(707) 363-9725	raquelpantoja@gmail.com
Young Planners Group Directors		
Lindsay Virdeh	(650) 235-5004	lindseyvirdeh@yahoo.com
Natalie De Leon	(408) 313-2662	natdeleon@sbcglobal.net

Regional Advisory Councils (RACs)

East Bay		
Joanna Jansen, AICP	(510) 848-3815	joanna@dcplanning.com
Jane Wardani	(510) 260-7180	jane@eccitybuilders.org
Monterey Bay		
Meryka Blumer	(916) 201-0201	Meryka_Blumer@yahoo.com
Elizabeth Caraker, AICP	(831) 372-1314	caraker@goldenstateplanning.com
North Bay		
Todd Miyasaki	(707) 935-3145	todd@sonomaecologycenter.org
Peninsula		
Suvachita Bose, AICP	(650) 393-4481	suvachitab@gmail.com
Redwood Coast		
Stephen Avis, AICP	(707) 725-1407	savis@ci.fortuna.ca.us
San Francisco		
Daniel Saraoso	(619) 850-1527	saraochile@hotmail.com
South Bay		
Katja Irvin, AICP	(408) 569-8214	katja.irvin@sbcglobal.net

(Directory continues, next page)

Local aging-friendly policies and programs in the San Francisco Bay Area *(continued from previous page)*

- ***Housing:*** accessory dwelling units, incentives for developers to guarantee units for seniors, incentives for developers to make new housing accessible, and home modification assistance;
- ***Transportation:*** driver education programs, driver assessment programs, slow-moving vehicle ordinances, alternative transportation, mobility management programs, measures to increase transit accessibility, and discounted transit fares;
- ***Health and supportive services:*** information directory, home- and community-based services, fitness programs, and preventive health programs; and
- ***Opportunities for community engagement:*** education programs, senior centers, intergenerational programs, and efforts to improve volunteer and work opportunities.

These aging-friendly innovations may change the physical and social environment of existing communities by potentially promoting:

- Community design that could allow older adults to remain mobile and connected to their community;
- Creating a wide variety of housing supports and choices;
- Developing a range of transportation services and mobility options;
- Improving access to home- and community-based health and social services; and
- Fostering opportunities for community engagement.

While no studies have yet investigated the impact of more aging-friendly communities in a holistic way, evaluations of specific aging-friendly innovations suggest that these changes can improve the health and well-being of older adults and help them age in place.

Methodology. In the first phase of this study, data obtained from Bay Area local government respondents via online surveys was combined with secondary data from the U.S. Census and the California *Cities Annual Report* for analyses. In the second phase, the researcher conducted open-ended interviews with a subsample of survey participants. The open-ended interviews served two purposes: 1) to expand upon the quantitative findings, uncovering aspects of the process of aging-friendly policy adoption and implementation that were not captured in the quantitative phase, and 2) to refine the survey instruments for future research.

A total of 62 out of 101 city planners/community development directors/housing specialists (61.4 percent) returned completed surveys. All nine directors of county adult and aging services departments completed the survey. For transportation respondents, five of nine county transportation authority employees (55.5 percent) and eight of 18 public transit agency employees (44 percent) filled out their respective surveys. Survey data collection took place between March and August 2009. Eighteen local government key informants completed a telephone interview, including 10 city planners/community development directors/housing specialists, four aging services directors/managers, one transportation authority employee, and three public transit agency employees. Interview data collection took place between October and December 2009.

(continued on next page)

NEWSLETTER INFORMATION

Editorial

Naphtali H. Knox, FAICP
Tel: (415) 699-7333
knoxnaph@gmail.com

Miko Miyasato, AICP
Associate Editor
Tel: (510) 587-8677
mmiyasato@bmlb.com

Caroline Teng
Associate Editor
Tel: (909) 967-5400
carolineteng@gmail.com

Advertising Director/Jobs

Hannah Young, AICP
Tel: (510) 847-9936
hannahyoung.mrp@gmail.com

Newsletter Designer

Nancy Roberts
Tel: (408) 723-3200
lproberts@sbcglobal.net

ADDRESS CHANGES

Membership Department
APA National Headquarters
205 North Michigan Ave, Suite 1200
Chicago, IL 60601
Tel: (312) 431-9100
www.planning.org

The American Planning Association, California Chapter Northern, offers membership to city and regional planners and associated professionals primarily living or working in California, from Monterey County to Del Norte County, including the nine county San Francisco Bay Area and Lake and San Benito Counties. APA California Northern promotes planning-related continuing education and social functions in order to:

- Provide an arena for communication and exchange of information about planning related activities;
- Raise member awareness and involvement in APA affairs;
- Increase public awareness of the importance of planning;
- Encourage professionalism in the conduct of its members; and
- Foster a sense of community among the members.

APA California Northern publishes *Northern News* online in PDF 10 times each year as a medium for the exchange of ideas and information among its members. Circulation (complete web downloads per issue) is 8,500.

Northern News welcomes comments. Letters to the editor require the author's first and last name, home or work street address and phone number (neither of which will be published), and professional affiliation or title (which will be published only with the author's permission). All letters are subject to editing. Letters over 250 words are not considered.

The deadline for submitting materials for inclusion in *Northern News* is the 15th day of the month prior to publication.

Local aging-friendly policies and programs in the San Francisco Bay Area *(continued from previous page)*

Findings. For the first research question:

- The most common aging-friendly innovations adopted by local governments include those that target alternative forms of mobility, including incentives for mixed-use neighborhoods, infrastructure changes to improve walkability, discounted public transportation fares, and changes to improve accessibility of public transit.
- *The least common policies and programs are those that aim to help older adults continue driving and those that provide incentives to develop accessible new housing for older adults.*

For the second research question:

- Bivariate analyses of city-level data provide partial support for previous findings in the policy adoption literature. Cities which have a larger total population, a larger percent of the population with a disability, and have experienced public pressure or individual advocacy for aging-friendly innovations have adopted more aging-friendly policies, programs, and infrastructure changes.
- *Contrary to hypotheses, cities with higher educational attainment, higher median household income, and a larger proportion of the population age 65 and older adopted fewer aging-friendly innovations.*

Qualitative interviews offered potential explanations for the above results.

1. Disability groups may be more active than older adults in terms of advocating for the adoption of aging-friendly innovations such as accessible housing and walkable neighborhoods.
2. Communities whose population enjoys a higher socioeconomic status may not perceive a strong role for local government in terms of creating more aging-friendly communities, and aging residents may get their needs met through nongovernmental sources.
3. There was no significant association between per capita government spending and the adoption of aging-friendly innovations. Interviews nevertheless suggest that funding plays an important role, and perhaps grant funding, slack resources, and recent increases or decreases in local government financial resources are a better measure of this factor.

The qualitative interviews also indicate that future studies should explore additional factors, including communication, collaboration, and state and federal mandates.

The findings of this study suggest a number of research and practice implications that should be explored further in future research.

- The results and limitations of this research suggest that it should be replicated to determine whether the findings explain local government adoption of aging-friendly innovations in general or are instead specific to the population and methods used in this study. This replication should not only expand the sample size and explore the generalizability of findings to other geographic regions, but should use a modified internal determinants and diffusion model that takes into account findings of the present study.
- While acknowledging the limitations of the current study, the results nevertheless offer a number of strategies that residents, advocates, service providers, and policymakers could employ in their efforts

(continued on next page)

Local aging-friendly policies and programs in the San Francisco Bay Area *(continued from previous page)*

to create more aging-friendly communities. These strategies include mobilizing public support of and pressure for aging-friendly innovations, targeting advocacy efforts at individuals working within government who could become policy entrepreneurs, and working towards vertical diffusion of innovations via state and federal mandates and funding.

It is also worth noting that the survey and interview results hint at additional lines of inquiry that should be pursued as part of a larger aging-friendly communities' research agenda: What exactly is an aging-friendly innovation or an aging-friendly community? How can communities change their physical and social environment in such a way that the needs and wants of older residents do not impede those of other residents? And what impacts do these policies, programs, and infrastructure changes have on the health and well-being of older adults and their ability to age in place?

This is a summary of a dissertation that received support from the Hartford Doctoral Fellows Program, the U.S. Department of Housing and Urban Development Doctoral Dissertation Research Grant, and the Society for Social Work Research. To request a copy of the full final report, please contact Amanda Lehning at **ajlehning@berkeley.edu**

References

AARP Public Policy Institute (2005). *Livable communities: An evaluation guide.* Washington, DC: AARP. Retrieved on July 8, 2009, from **http://assets.aarp.org/rgcenter/il/d18311_communities.pdf**

Hanson, D., & Emlet, C.A. (2006). Assessing a community's elder-friendliness: A case example of the AdvantAge Initiative. *Family and Community Health, 29,* 266-278.

Lehning, A., Chun, Y., & Scharlach, A. (2007). Structural barriers to developing 'aging-friendly' communities. *Public Policy & Aging Report, 17,* 15-20.

National Association of Area Agencies on Aging (N4A) and Partners for Livable Communities (2005). *The maturing of America: Getting communities on track for an aging population.* Retrieved on July 20, 2007, from **http://www.n4a.org/pdf/MOAFinalReport.pdf**

Where in the world?

Photo by Christopher Corbett

(Answer on page 11)

From: http://reconnectingamerica.org/posts/the-role-of-the-bicycle-in-transit-oriented-development

The Role of the Bicycle In Transit Oriented-Development

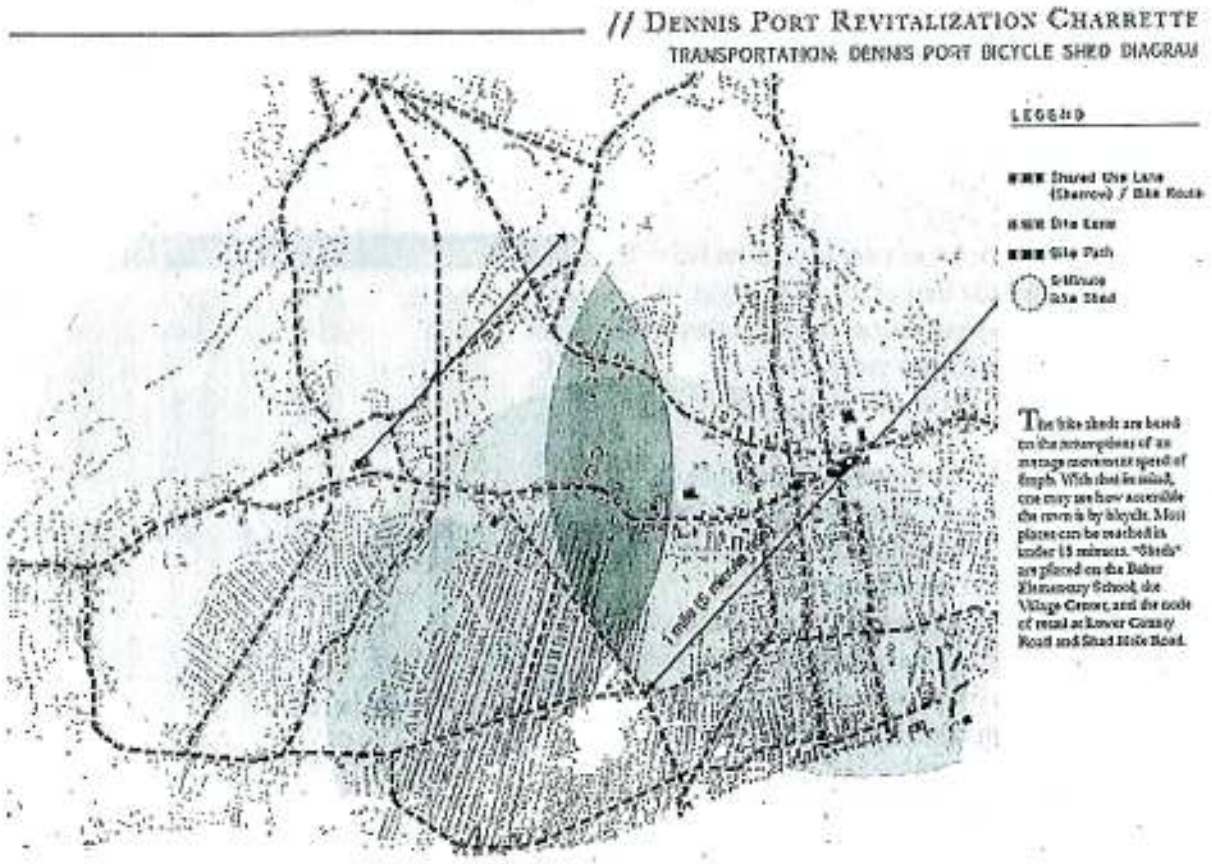
[This is the first of four-part expert blog post by Mike Lydon, the founding Principal of The Street Plans Collaborative. Lydon's posts are part of a series of expert blogs on TOD highlighting work and research that experts are doing in the field.]

Introduction

Last month Kaid Benfield asked for more rigor when defining transit-oriented development—a term applied liberally to development merely served by transit, he says. In highlighting several design principles that make for authentic TOD, Benfield sensibly included "bicycle transfers" should be made easy. Quite simply, this means that what you do with your bicycle upon arrival is as important as being able to get there safely on two wheels in the first place.

While few would disagree, and provisions for bicycle facilities are almost always included in TOD best practice guidelines, their implementation is often neglected, especially outside of the immediate station area.

In response, this four part blog series will focus on the techniques and benefits of better integrating world-class bicycle infrastructure into transit-oriented development.



The Bicycle Shed

The type and quality of transit service aside, planners generally accept that the average person will walk up to ½ mile to transit if the environment is safe, convenient, and interesting. Indeed, this blog's name references this principle, the so-called "pedestrian shed." After this approximate radial limit is reached, however, it is assumed that transit's ability to attract ridership decreases as distance from the station increases.

Yet, if one considers that the average bicyclist can move 3 times faster than the average pedestrian, then the formulation of nuanced "bicycle sheds" can greatly expand transit station catchment areas, while also improving the extent and utility of the regional bikeway network. Indeed, just as a 5 or 10-minute walk should be convenient and enjoyable for the pedestrian, so to should it be for the average bicyclist, who is able to cover much more ground with an equal outlay of time.

But if transit-centered bicycle sheds are to function properly, a myriad of physical and policy challenges must be overcome. The following three blog posts will detail what these are, and how Bicycling to TOD can exponentially improve accessibility to transit and the viability of any development oriented to it.

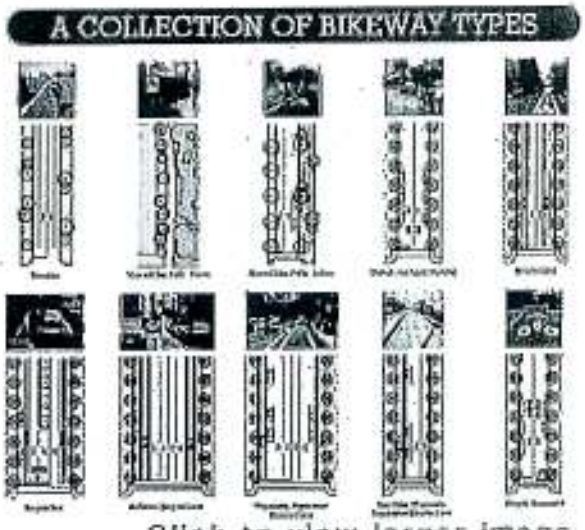
Part 1: The Role of the Bicycle In Transit Oriented-Development
Part 2: The Bikeway Network
Part 3: At the Station - Bicycle Parking
Part 4: Policy and Urban Design: How to Complete Bicycle Supportive Cities

---

With Andres Duany and Jeff Speck, Mike Lydon is the co-author of The Smart Growth Manual.
Posted on February 3, 2010 by Reconnecting America | Permalink Leave a comment

The Bikeway Network

[This is the second of four-part expert blog post by Mike Lydon, the founding Principal of The Street Plans Collaborative. Lydon's posts are part of a series of expert blogs on TOD highlighting work and research that experts are doing in the field.]



Click to view larger image

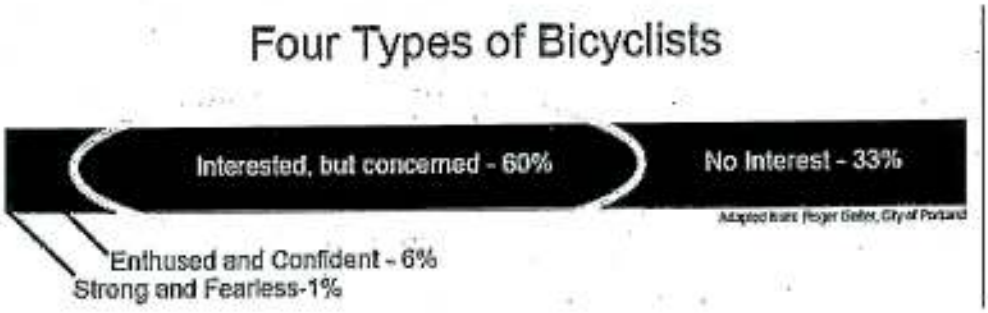
While the bicycle shed is an important conceptual planning tool, it is meaningless without the physical development of bicycle infrastructure. Therefore, each bicycle shed should not be conceived in isolation, but as part of a regional bikeway network. This network should be designed to connect people to important destinations—schools, neighborhood centers, regional centers, open space, and of course, local and regional transit systems.

In general, the bicycle network should be comprised of many bikeways types. These include, but are not limited to shared-use paths, shared lanes (sharrows), bicycle boulevards, bicycle lanes, and physically separated bicycle lanes—sometimes called cycle tracks.

Before assigning bikeway types, the unique characteristics of each thoroughfare and its urban context must be considered holistically. This includes analyzing street width, street type, existing land use and urban form, density, traffic control devices, posted speed limits and actual travel speeds, and traffic volume.

But while the existing conditions of each thoroughfare are important, the urban context is rarely static. Therefore, considering the desired character and urban context is critical to the selection process, as context-specific bikeways can help strengthen a more immersive, accessible, and equitable urban environment.

To this end, special emphasis should be placed on providing safety and comfort for all types of bicyclists. Bikeway infrastructure that appeals to those who are interested in bicycling, but who are too often deterred by the perception—and reality—of unsafe bicycling conditions, must be prioritized. Research conducted by Roger Geller, Bicycle Coordinator for the City of Portland, Oregon, identifies four types of bicyclists, of which the majority seek more comfort and safety. "Riding a bicycle should not require bravery. Yet, all too often, that is the perception among cyclists and non-cyclists alike," says Geller.



Taking a cue from their European counterparts, North America's most bicycle-savvy cities are designing bikeways to accommodate the least confident user. This approach provides an opportunity to increase bicycle mode share by further enriching the safety of the overall bikeway network. Indeed, safer bicycling conditions attract more bicyclists to the roadway, which in turn, creates even safer conditions. This so-called 'virtuous cycle' is set in motion when paying attention to the most vulnerable users, and should be used to intelligently enhance bikeway networks and the viability of bicycling to transit.

While the provision of bikeways is the most visible element in a citywide bikeway network, bicyclists must also have safe and convenient places to store their bicycles at a trip's end. Part three of this series will discuss the design, location, and allocation of bicycle parking, and how it complements regional bikeway and transit networks.

Part 1: The Role of the Bicycle In Transit Oriented-Development
Part 2: The Bikeway Network
Part 3: At the Station - Bicycle Parking
Part 4: Policy and Urban Design: How to Complete Bicycle Supportive Cities

---

With Andres Duany and Jeff Speck, Mike Lydon is the co-author of The Smart Growth Manual.
Posted on February 12, 2010 by Reconnecting America | Permalink

Policy and Urban Design: How to Complete Bicycle Supportive Cities

[This is the final of four-part expert blog post by Mike Lydon, the founding Principal of The Street Plans Collaborative. Lydon's posts are part of a series of expert blogs on TOD highlighting work and research that experts are doing in the field.]

The three previous articles explained how developing a well-articulated bikeway network with high quality end-of-trip facilities is crucial to multimodal transportation. However, without overcoming some additional policy and fundamental urban design barriers, the full integration of bicycling with other modes of transit will remain stunted.

Photo by Ned Ahrens, King County DOT

King County employs bus racks to provide options for urban commuters.

While most bicyclists prefer to ride, some distances are too great to travel entirely by bicycle, and in most places, the weather doesn't always cooperate. Thus, being allowed to bring a bicycle onboard the bus or train is vitally important, as it provides additional mobility choices when you need it most.

Nowadays, it is increasingly common to see bicycles on the front of buses and inside trains. However, this was not always the case, as the right to do so required lengthy and hard fought battles that typically put transit officials and bicycle advocates at odds. But even with the steady increase in bicycle access, many government agencies still impose peak hour restrictions on their transit systems. Likewise, some bus systems, like New York City's, still do not provide bus racks for bicyclists.

Fortunately, some enlightened transportation agencies don't see bicyclists as peak hour spacehogs, but as additional revenue. Indeed, Portland, Oregon's TriMet revamped its policies in 1996 to reflect the growing demand for bicycle/transit services. They also specifically use low-floor boarding designs to meet the needs of specific user groups, including bicyclists. Their message: " When you can't bike the whole way, take TriMet."

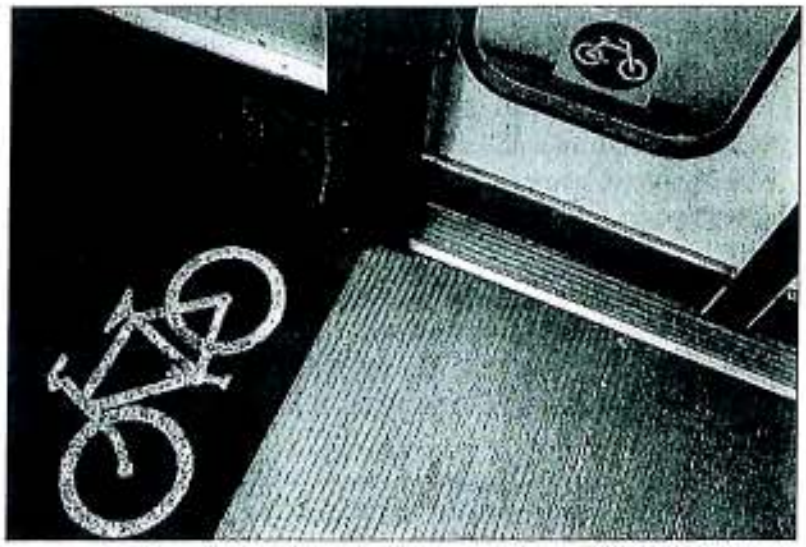


Photo by Zach Behrens

Portland, OR, clearly marks where bicyclists should store their wheels.

For those trains that do allow bicycles on board, it is always nice to visibly welcome their presence and provide a well-marked place for temporary storage. Some

agencies restrict bicyclists to certain train cars, but use large bicycle stencils to indicate which cars are appropriate for bicyclists.

Station Access

While access onto the train is critical, so too is station access to the train. Stairs, platforms, turnstyles etc. are not only physical barriers for bicyclists, but mental barriers as well. Quite simply, nobody wants to publicly struggle with a bicycle in a crowded transit station, Thus, all stairways leading to and from transit platforms and farboxes should be designed (and retrofitted) to include accommodations for bicyclists, such as bicycle-specific ramps.

Additionally, turnstyles should be widened and automated not only for bicyclists, but for those carrying luggage and other oversized packages on the train. Such provisions make multimodal travel more practical, especially for the young and old who may not be as nimble or physically capable.

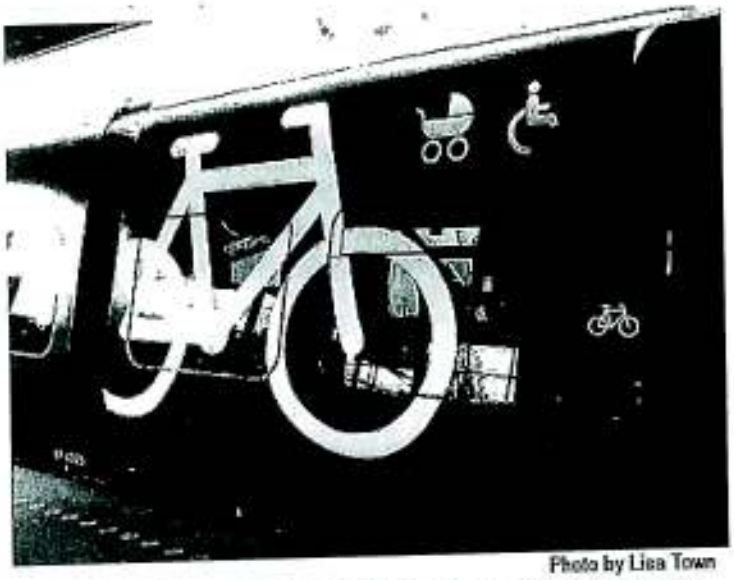
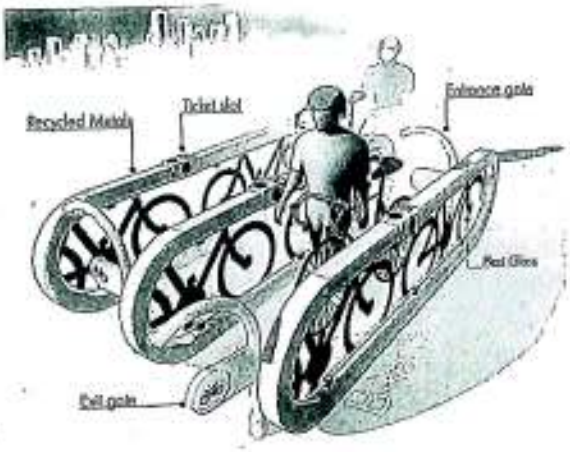


Photo by Lisa Town

Copenhagen's commuter trains boldly advertise space for bicyclists.



CTA Train station | Bicycle entrance

Illustration by Tuna Rocky and Adair Heinz

Students were tasked with re-envisioning Chicago's CTA stations with a more

Photo by Steven Vance

Bike-friendly stairs make.

Beyond the Station

While not immediately obvious, the placement and design of rail infrastructure is essential to maintaining bicyclist safety, as bicycle wheels are easily caught in the flange gap between the rails, which causes crashes. While investigating this all too common problem, Alta Planning + Design developed Bicycle Interactions And Streetcars: Lessons Learned and Recommendations, which provides ways to best integrate rail infrastructure with bicycle facilities so that both are mutually supportive. Additionally, StreetFilms recently illuminated the proper way to navigate inlaid train tracks, demonstrating that bikeway design can further alleviate the risk of crashing.

Photo by Andrew Van Tassel
When designed poorly, train tracks can lead to additional risks for bicyclists.

Land Use Patterns and Built Form – Getting the Land Use Right

Finally, Norman Garrick's research reveals that urban form plays a critical role in encouraging bicycling. In short, more people bicycle, and bicycle safely as density and land use intensity increases. Indeed interconnected street grids—common to dense places—place more destinations within bicycling distance, provide opportunities for safe alternative routes, and help make bicycling the most efficient mode of urban transport. While somewhat obvious, this helps explain why cities attract more bicyclists than suburban or rural areas.

Conclusion

Here in New York City, where the transit coverage is unrivaled in the United States, the city would not only benefit from the implementation of a more robust TOD policy, but also from strategies to retrofit the street network to optimize bicycle travel to and from MTA stations and bus stops. Indeed, as much value as such infrastructure provides, it is not being optimized. Fortunately, a recent report from the Department of City Planning outlines a strategy for better integrating bicycle travel into the citywide transit system. If wise, your city and region will take many of the extra steps outlined here to do the same.

Part 1: The Role of the Bicycle In Transit Oriented-Development
Part 2: The Bikeway Network
Part 3: At the Station - Bicycle Parking
Part 4: Policy and Urban Design: How to Complete Bicycle Supportive Cities

---

With Andres Duany and Jeff Speck, Mike Lydon is the co-author of The Smart Growth Manual.
Posted on April 16, 2010 by Reconnecting America | Permalink

Related policies from General Plan 2020

Source: http://www.cityofsanrafael.org/Government/Community_Development/General_Plan_2020.htm

NH-88. Sonoma Marin Area Rail Transit (SMART) Station.

If rail service is initiated, support construction of a Civic Center SMART station. Encourage a plan that provides high density housing, bus transit connections, a parking lot, and incorporates pedestrian facilities and bicycle access (including bike storage facilities) consistent with the San Rafael Bike and Pedestrian Master Plan.

NH-88a. Transit-Oriented Development. Work with SMART, Marin County, Golden Gate Bridge Transit District and other transit providers to prepare a site-specific design for a transit-oriented development with housing in the vicinity of the rail station.
Responsibility: Community Development
Timeframe: Long Term
Resources: General Fund, Grants

NH-88b. Safe Walkways and Bikeways. Encourage the provision of lighting and sidewalks to ensure safe and attractive walkways and bikeways from the transit center, on both sides of Civic Center Drive, to the Northgate area.
Responsibility: Public Works
Timeframe: Long Term
Resources: Staff Time

NH-131. North San Rafael Town Center.

Create an attractive, thriving heart for the North San Rafael community: a centerpiece of commerce and activity with a diversity and synergy of activities for all ages.
See LU-2a (Development Review).

NH-132. Town Center Activities.

Create a Town Center with high quality retail stores for local residents as well as the broader community. Broaden the appeal of the Town Center area by improving pedestrian traffic, increasing the number of local shoppers, and attracting a mix of high quality stores, entertainment, and services.

a. Encourage a distinctive commercial niche for the Town Center consistent with the area's characteristics.
b. Encourage a variety of stores and services to foster local patronage. Examples include a library; restaurants; a produce market; and music, book, family clothing, housewares, and variety stores.
c. Encourage upgrading of anchor stores and specialty stores.
d. Support an additional high quality retail anchor store if necessary for economic vitality, consistent with traffic circulation.
e. Support nightlife activities, such as a late-night restaurant, diner or coffee shops that harmonize with existing theaters and cultural activities.

See LU-2a (Development Review).

NH-148. Residential Use at the End of Merrydale Road.

Evaluate amending the General Plan and Zoning Ordinance to promote residential uses at the end of Merrydale Road.

NH-148a. Zoning Change. Consider amending the General Plan and Zoning Ordinance to allow housing at the end of Merrydale Road.
Responsibility: Community Development
Timeframe: Long Term
Resources: Staff Time

http://www.reconnectingamerica.org/public/download/twincitiesglossary

TOD Toolkit: Glossary

AA — See *Alternatives Analysis*

ADA — See the *Americans with Disabilities Act.*

Affordable housing — Housing that costs no more than 30 percent of a household's annual income. Families who pay more than 30 percent of their income for housing are considered cost burdened and may have difficulty affording necessities such as food, clothing, transportation and medical care.

Alternatives Analysis (AA) — The official first phase of study of a Federally-funded transportation project. The Alternatives Analysis examines different options to improve mobility in a given corridor. The product of an Alternatives Analysis is a Locally Preferred Alternative (LPA).

American Public Transit Association (APTA) — A national membership organization comprised of transit agency and industry representatives and advocates.

Americans with Disabilities Act (ADA) — A wide-ranging civil rights law that prohibits discrimination based on disability and requires many public facilities, including transit, to accommodate people with disabilities.

AMI — See *area median income.*

APTA — See *American Public Transit Association.*

Area Median Income (AMI) — State and MSA-level calculations of median income, completed on a year-by-year basis by HUD, to establish maximum income limits for affordable housing programs.

Assessment districts — District created by local jurisdiction or businesses to collect taxes or other fees; many different types of assessment districts

BID — See *business improvement district.*

BRT — See *bus rapid transit.*

Bus rapid transit (BRT) — Buses running in dedicated lanes that have increased station visibility and specific Intelligent Transportation Systems (ITS) capabilities.

Business improvement district (BID) — *See assessment districts.*

CBD — See *central business district.*

CDBG — See *Community Development Block Grant.*

CDC — See *community development corporation.*

Central business district (CBD) — Downtown, the area in a city or town with the largest concentration of employment, retail and civic uses.

Charette — A collaborative community planning and design process that brings stakeholders together in intensive work sessions to develop plans for their neighborhoods or regions.

Choice rider — Transit riders who could afford to own and operate a personal automobile but choose to take transit.

Circulator — Term describing the transit function of streetcars, which often circulate people through a district rather than providing point-to-point transportation.

CMSA — See *consolidated metropolitan statistical area.*

Community benefits agreement — Legally binding contracts between developers and community coalitions that describe community benefits that the developer has committed to provide as part of a development project. Benefits are designed by local residents to meet community needs. See also developer agreement.

Community Development Block Grant (CDBG) — The largest Federal source of financial assistance for supporting neighborhood revitalization, housing rehabilitation and economic development activities; program is administered by the US Department of Housing and Urban Development.

Community development corporation (CDC) — Non-profit entities that provide benefits and services to surrounding communities such as affordable housing, job training, or economic development projects.

Commuter rail — Class of transit vehicle; these passenger vehicles are required to be larger than light rail or heavy rail by the Federal Railroad Administration because they run in similar right of ways as freight lines.

Consolidated Metropolitan Statistical Area (CMSA) — A geographic entity designated by the Federal Office of Management and Budget (OMB) for use by Federal statistical agencies; an area becomes a consolidated metropolitan statistical area (CMSA) if it qualifies as a metropolitan area (MA), has a census population of 1,000,000 or more, has component parts that qualify as primary metropolitan statistical areas (PMSAs) based on official standards, and local opinion favors the designation. CMSAs consist of whole counties except in New England,

where they consist of county subdivisions (primarily cities and towns).

Context sensitive design — An interdisciplinary design that involves all stakeholders to develop a multi-modal transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while promoting pedestrian safety and mobility.

Corridor — The area served by a transit line from end to end. In the context of transportation planning studies, the corridor may be very broad and may include several possible end points.

CTOD — Center for Transit-Oriented Development. A national non-profit dedicated to supporting development-oriented transit and transit-oriented development through research, best practices, and technical assistance.

Developer agreement — Legally binding contracts between developers and public agencies that set out benefits and/or amenities a developer will provide as part of a new project. May be required as a condition of development approvals. See also community benefits agreement.

Displacement — A process where land values increase in an existing neighborhood to the point that existing residents can no longer afford rents, sales prices, or taxes and are forced to seek housing elsewhere.

DUA — See *dwelling units per acre.*

Dwelling units per acre (DUA) — A measure of density; the number of housing units per acre of land area.

Economic development corporation (EDC) — A non-profit entity that promotes economic development within a region

EDC — See *economic development corporation.*

Entitlement process — The steps a developer must complete to obtain legal permission to begin construct of a proposed development; for instance, one step in most entitlement processes is obtaining public approval of a site plan.

Euclidian zoning — Zoning that promotes the separation of different types of land use. Named after Euclid, Ohio, the community that brought the supreme court case that established the legality of this type of land regulation.

FAR — See *floor-area ratio.*

FD — See *Final Design.*

Federal Transit Administration (FTA) — The division of the U.S. Federal Highway Administration (FHWA) that oversees Federally mandated transit planning processes and manages Federal grants that support the operation and construction of transit systems and acquisition of transit vehicles and equipment.

FFGA — See *full-funding grant agreement.*

Final Design (FD) — The last phase in the New Starts project development process before construction. Includes right-of-way acquisition, utility relocation, and the preparation of final construction plans.

Fixed-Guideway Transit or Fixed-Route Transit — Transit vehicles operating in a separated grade, as when rail tracks are elevated above or sunk below surrounding land, or in a right-of-way dedicated to that transportation mode.

Floor-area ratio (FAR) — The relationship between the total area of a building and the size of the parcel on which it sits. Often expressed as a ratio such as 3:1 or .5:1.

Form-based code — Development Code that prescribes the building types instead of land uses.

FTA — See *Federal Transit Administration.*

Full-funding grant agreement (FFGA) — An agreement between the Federal Transit Administration and a project sponsor to provide a guaranteed level of funding for a transit project. The FFGA is the culmination of the New Starts project development process.

Grade separation — See *fixed guideway transit.*

Greyfields — An area that is not yet blighted but is already suffering from excess vacancies that could be redeveloped for multiple uses. Primarily applied to aging retail and commercial sites.

Half-mile radius — Typical distance of the impact of fixed-guideway transit; approximately a 10-minute walk, or the distance people are assumed to be willing to walk to access fixed-guideway transit.

Headway — The time between buses or trains operating on a single route.

Heavy rail — A rapid transit technology that is fully grade-separated and operates using electricity pulled from a third rail. Examples of heavy rail or "metro" systems include the New York City subway, the Washington Metro and BART in San Francisco.

HOME Grants — The largest Federal block grant given by the U.S. Department of Housing and Urban Development (HUD) to state and local governments; designed exclusively to produce affordable housing for low-income families.

Home rule — The legal tradition of local autonomy in place of state control. Home rule over certain issues may be delegated to local governments by state law or it may be a robust tradition that is politically difficult to break.

HOPE VI — A Federal housing program that began in 1992 to transform and replace severely distressed public housing

with innovative urban neighborhoods that tried to lessen concentrations of poverty and promoted mixed-income communities.

Housers — Term coined for workers and practitioners in the housing industry.

HUD — See *U.S. Department of Housing and Urban Development.*

Infill — Redevelopment of underutilized or currently vacant properties in an existing urban environment.

Intelligent Transportation Systems (ITS) — Transportation infrastructure and vehicles that employ information and communications technology to improve capacity, flow, safety and ease of use.

ITS — See *intelligent transportation systems.*

Land assembly — Acquiring adjoining parcels of land in order to place them under single ownership and make them simpler to develop or redevelop.

Land bank — To buy and hold land with the goal of later redevelopment, in order to avoid speculative and developmental pressures or to provide interim maintenance of neglected properties. The land is often intended for a use that benefits the larger public such as affordable housing. Also a public or non-profit agency that acquires and holds land.

Light rail transit (LRT) — A range of rail transit modes, encompassing streetcars through heavier weight vehicles on mostly grade-separated systems.

Local improvement district (LID) — See *assessment districts.*

Locally Preferred Alternative (LPA) — The transportation mode and rough alignment selected as the best solution for mobility issues in a given corridor. The locally preferred alternative is the result of an Alternatives Analysis. Once approved by the Federal Transit Administration, the LPA is further studied during the Preliminary Engineering phase of the New Starts process.

Location efficiency — The deliberate placement of homes, jobs, shopping, entertainment, parks and other amenities close to transit stations to promote walking, biking and transit use.

Long range transportation Plan (LRTP) — See *metropolitan transportation plan.*

Low- to moderate-income working families — Households in which at least one wage earner works the equivalent of a full-time job and earns between $1,700 per month (the minimum wage) and up to 120 percent of the median income in their area.

LPA — See *locally preferred alternative.*

LRT — See *light rail transit.*

LRTP — See *long range transportation plan.*

Metro Housing and Redevelopment Authority — The housing and redevelopment authority for the Twin Cities region of Minnesota.

Metro HRA — See *Metro Housing and Redevelopment Authority.*

Metro Transit — The transit authority for the Twin Cities region of Minnesota.

Metropolitan Council — The metropolitan planning organization (MPO) that makes regional transportation, land use and public housing decisions for the Twin Cities region of Minnesota and and operates Metro Transit.

Metropolitan planning organization (MPO) — The policy board of an organization created and designated by Federal law to carry out the metropolitan transportation planning process. In the Twin Cities, the Metropolitan Council serves as the MPO.

Metropolitan region — A major city center and surrounding cities and suburbs, generally defined as the standard, Federally-defined Metropolitan Statistical Area (MSA) or Consolidated Metropolitan Statistical Area (CMSA).

Metropolitan statistical area (MSA) — A geographic entity designated by the Federal Office of Management and Budget for use by Federal statistical agencies; An MSA consists of one or more whole counties not closely associated with other Metropolitan Areas.

Metropolitan Transportation Plan (MTP) — A Federally-mandated 20-year plan for transportation infrastructure and service. The plan must be updated at least every four years. The MPO is responsible for its preparation. In the Twin Cities, the most recent version of this plan is the 2030 Transportation Policy Plan, which was adopted in 2004.

Mixed-income — A single neighborhood or development offering housing in a range of prices.

Mode share — The share of people using a particular mode of transportation, expressed as a percentage of all travelers.

MPO — See *metropolitan planning organization.*

MSA — See *metropolitan statistical area.*

MTP — See *metropolitan transportation plan.*

NDC — See *neighborhood development corporation.*

Neighborhood development corporation (NDC) — Non-profit entities that provide benefits and services to surrounding

communities such as affordable housing, job training, or economic development projects; synonymous with community development corporations.

New Starts — The Federal government's primary financial resource for supporting locally-planned, implemented, and operated major transit capital investments, including light rail, streetcars, commuter rail and bus rapid transit systems. May also refer to projects funded with New Starts grants.

NIMBY — A resident who opposes development in their area. Stands for "not in my backyard."

On-street parking — Parking that is located in the public right-of-way.

Parcelization — The division of land into smaller pieces.

Parking requirements or parking ratios — The amount of parking required by a development code, expressed as a relationship with the square footage of a space; e.g. one space per 250 square feet of built space. Parking ratios often vary depending on the use and location.

PE — See *preliminary engineering.*

Pedestrian-oriented — Built to accommodate and cater to the needs of pedestrians. Often used in contrast to transportation facilities built to cater to the needs of motor vehicles.

Pedscape — The landscape from the point of view of a pedestrian. Usually refers to a pedestrian-oriented landscape.

Place-making — The creation of place through pedestrian orientation and public spaces in the public realm of a district.

Potential demand — The projected number of households that are likely to prefer relatively compact housing in a transit zone if such housing exists with the characteristics they deem important, including but not limited to neighborhood amenities such as retail, unit size, and competitive pricing.

Preliminary engineering (PE) — The second phase of the New Starts project development process, in which the project sponsor develops and refines the locally preferred alternative with enough specificity to complete an environmental impact statement and to identify all potential impacts and costs.

Primary Metropolitan Statistical Area (PMSA) — A geographic entity designated by the Federal Office of Management and Budget for use by Federal statistical agencies. If an area that qualifies as a metropolitan area (MA) has a census population of one million or more, two or more primary metropolitan statistical areas (PMSAs) may be defined within it if they meet official standards and local opinion favors the designation. When PMSAs are established within an MA, that MA is designated a consolidated metropolitan statistical area (CMSA).

Project Sponsor — In the New Starts process, the governmental agency responsible for coordinating planning, design, and engineering of a Federally-funded transit project. Usually a transit operator, but may also be a state, regional or local government.

Public Use Microdata Series (PUMS) — U.S. Census data specially adapted for easy use.

Public/Private partnership — A system in which a government service or private business venture is funded and operated through a partnership of government and one or more private sector companies.

PUMS — See *Public Use Microdata Series.*

Rapid transit — High-capacity, high-frequency transit operation that often runs in its own guideway or right-of-way.

Residential density — The number of housing units in a given area of land, usually expressed in dwelling units per acre (DUA).

Ridership — Number of riders on a system, often calculated by year or average weekday.

Right-of-way (ROW) — The designated path through which transportation infrastructure passes. May be privately or publicly owned, and can include road, rail, bicycle and pedestrian infrastructure.

Smart growth — Development planned and designed to protect open space and farmland, revitalize communities, keeps housing affordable, promote economic development and provide more transportation choices. Smart growth promotes cooperation between often diverse groups to arrive at sustainable long-term strategies for managing growth.

Streetcar — A subset of light rail in which vehicles operate primarily on the street, mixing with traffic.

Streetcar suburbs — Communities that were shaped and served by streetcars during the late 19th to early 20th Centuries, the time when streetcars were most popular.

Streetscaping — The addition of special attributes to a street such as trees, benches and other amenities.

Surface parking — Parking located on the surface of a property; a parking lot.

Tax increment financing (TIF) — A tool used to capture the future tax benefits of real estate improvements

in a designated area to pay the present cost of those improvements.

TIF — See *tax increment financing.*

TIP — See *transportation improvement plan.*

TOD — See *transit-oriented development.*

Transit corridor — *See corridor.*

Transit region — A Census-defined metropolitan area with a fixed-guideway transit system. Depending on the region and the size of the system, the metropolitan areas are metropolitan statistical areas (MSAs), primary metropolitan statistical areas (PMSAs), or consolidated metropolitan statistical areas (CMSAs).

Transit station area (TSA) — A land use category in the Minneapolis Comprehensive Plan. TSA's are areas around dedicated, fixed-route transit lines that provide unique opportunities for investment in development that maximizes the use of transit.

Transit zone (TZ) — The area within a one half-mile radius of a transit station.

Transit-oriented development (TOD) — The whole district surrounding a transit station, comprised of several projects and a mix of uses, the streetscape and walking environment, and integrated design, land use and activity that support transportation choice.

Transportation improvement plan (TIP) — A Federally-mandated three-year plan for transportation capital improvements. The TIP must conform with the metropolitan transportation plan and is fiscally-constrained, meaning that funding for included projects must be identified in the plan. The metropolitan planning organization is responsible for preparing this plan and coordinating public participation.

TSA — See *transit station area.*

Twin Cities — The region including Minneapolis, St. Paul and the surrounding seven-county metropolitan area.

TZ — See *transit zone.*

U.S. Department of Housing and Urban Development (HUD) — The Federal agency responsible for administering grants to build and maintain public housing, support individual home ownership, and support community development and redevelopment.

ULI — See *Urban Land Institute.*

UMTA — See *Urban Mass Transit Administration.*

Underutilized properties — Parcels where improvements are worth less than the land on which they are built.

Urban Land Institute (ULI) — An association of developers and development professionals.

Urban Mass Transportation Administration (UMTA) — The original name of the Federal Transit Administration.

Value capture — The capture of increased value or savings resulting from new infrastructure. For local governments, value capture can mean higher tax revenues from increased sales and property values; for the transit agency, value capture means lease revenues from joint development, increased farebox revenues, and lower costs of providing access.

Vehicle miles traveled (VMT) — The total number of miles traveled in automobiles and other vehicles in a specified area.

VMT — See *vehicle miles traveled.*

Workforce housing — Market-rate residential units that are affordable to the typical household with at least one full-time wage earner; often contrasted with luxury housing.

Sources

"Transit-Oriented for All." Great Communities Collaborative; Center for Community Innovation; Center for Transit-Oriented Development. (pp 41-44)
http://communityinnovation.berkeley.edu/publications/GCCFramingPaper_FINAL.pdf

Cervero, Robert; Sullivan, Cathleen. "Are Suburban TODs Over-Parked?" Journal of Public Transportation.
http://www.nctr.usf.edu/jpt/pdf/JPT13-2Cervero.pdf

Fulton, Bill. "The New Suburban Dream." California Planning & Development Report.
www.cp-dr.com/node/2765

Fulton, Bill. "Walkscore As A Planning Tool." California Planning & Development Report.
www.cp-dr.com/node/2592

Lehning, Amanda. "Local aging-friendly policies and programs in the San Francisco Bay Area." Northern News. American Planning Association, California Chapter.
www.norcalapa.org/assets/chapter/newsletter/July_August10.pdf

Lydon, Mike. "The Role of the Bicycle and In Transit-Oriented Development"
http://reconnectingamerica.org/posts/the-role-of-the-bicycle-in-transit-oriented-development

"Choosing Where We Live: Attracting Residents to Transit-Oriented Neighborhoods in the San Francisco Bay Area." Metropolitan Transportation Commission. (pp 21-33)
http://www.mtc.ca.gov/planning/smart_growth/tod/5-10/Briefing_Book-Choosing_Where_We_Live.pdf

"TOD Toolkit: Glossary." Reconnecting America.
http://www.reconnectingamerica.org/public/download/twincitiesglossary

Terplan, Egon. "Job sprawl in the megaregion." SPUR.
http://www.spur.org/publications/library/article/job_sprawl_megaregion

Terplan, Egon. "Thriving TOD." SPUR.
http://www.spur.org/publications/library/article/thriving_tod

Walkscore.com
www.walkscore.com