

State of the Literature: Transit-Oriented Development

Assessing the Impacts of the New Jersey Transit Village Initiative

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INTRODUCTION

Traffic congestion, poor air quality, suburban sprawl, and urban decay have prompted a movement referred to as “smart growth.” As seen in Figures 1 and 2, sprawling developments across the United States are consuming land and generating congested highways. They are also leading to a host of other economic, environmental, and social problems.



Figure 1. New residential development in the Denver metropolitan region.



Figure 2. Traffic congestion in Pennsylvania.

Many claim that transit-oriented development (TOD) holds the answer to solving these problems. Transit villages (TVs or TODs, often used interchangeably) have been hailed as a model for integrating land use with transportation (Calthorpe 1993; Cervero 1998; Newman and Kenworthy 1999). Calthorpe defines a TOD as

a mixed-use community within an average 2,000-foot walking distance of a transit stop and a core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot or car. (p. 56)

During the past few years, TOD has become a hot topic for the transportation, planning, development, and related fields. The October 2002 Rail~Volution conference, led by Congressman Earl Blumenauer from Portland, Oregon, attracted over a thousand participants to Washington to discuss the various aspects of “building livable communities with transit” and present case studies of an increasing number of TOD projects across the country.

Another indication of the proliferation of TOD in the United States is the release of two reports — *Transit Oriented Development: Moving from Rhetoric to Reality* (Belzer and Autler 2002) by the Brookings Institution; and *Transit Oriented Development and Joint Development in the United States: A Literature Review* (Cervero, Ferrell, and Murphy 2002) by the Transit Cooperative Research Program (TCRP) — illustrate the growing importance of this type of development. Furthermore, the State of California’s Department of Transportation (California DOT) released a report titled the *Statewide*

Transit-Oriented Development Study: Factors for Success in California (California Department of Transportation 2002a). This report gives an in-depth look at TOD and makes policy recommendations.

Although the literature about TOD is relatively new, the concept is relatively old. The transit city of the late 19th and early 20th centuries can be characterized as a TOD. According to Newman and Kenworthy (1999, 29), “trains generally created subcenters at railway stations that were ‘cities’ with walking-scale characteristics. Trams, on the other hand, created linear development that followed the routes in corridors or ‘main streets.’ In both cases, medium-density, mixed-use areas were formed at the rail nodes and along the tram routes.”

Today, the literature about TOD is reviving this historic model. The modern TOD concept has two main components. First, financial investments are being made in commuter rail stops to revitalize urban areas that have economically decayed. Places like Rahway, New Jersey, are redeveloping with a focus upon their rail station. Abandoned buildings and lots will be reused, providing benefits to both the public and private sectors of the community. These benefits will include more jobs, retail opportunities, vibrant street life, tax revenues, and new housing opportunities, in addition to environmental benefits. The second component of the modern TOD concept is related to light rail. Light rail is a modern form of a tram where stops are more closely spaced together compared with commuter rail. This type of rail technology allows for linear development opportunities. For instance, in Northern New Jersey, the Hudson-Bergen light rail — though relatively new in operation — has already begun to see anecdotal evidence of this increase in investment along the corridor.

Again, the concept of TOD is not new, but literature on the topic has seen a resurgence in recent years. Peter Calthorpe’s *The Next American Metropolis* (1993) is the major work responsible for reintroducing these concepts to the planning and development professions. Since this book was published, both the literature and practice have seen these concepts reemerge as a primary force for the smart growth agenda. The next section will provide a selected summary of the Brookings, TCRP, and California DOT reports mentioned above. These reports do a good job of summarizing the existing literature on TOD in addition to suggesting future policies. Since they were all recently published by credible sources, this paper will not replicate their work but use it as a foundation.

SELECTED SUMMARY OF *TRANSIT ORIENTED DEVELOPMENT: MOVING FROM RHETORIC TO REALITY*

The Brookings report¹ identifies three major trends that characterize American cities:

1. The resurgence of investment in America's downtown areas
2. The continuing growth and emerging maturity of America's suburbs, many of which are struggling to become cities in their own right
3. A renewed interest in transit use and transit investment

As a result of changing demographics, which is leading to an increased demand for urban living, Brookings believes that a substantial new market exists for TOD:

At the convergence of these three trends is the realization that a substantial market exists for a new form of walkable, mixed-use urban development around these new rail or rapid bus stations and transit stops... These [TODs] have the potential to provide residents with improved quality of life and reduced household transportation expenses while providing the region with stable mixed income neighborhoods that reduce environmental impacts and provide real alternatives to traffic congestion. (from the foreword)

Although Brookings acknowledges the large potential market for TODs, it also recognizes major obstacles. Many of the emerging projects across the United States fail to achieve the design requirements to be a true TOD. "Most often they have conventional suburban single use development patterns, with conventional parking requirements, so the development is actually transit-*adjacent*, not transit-*oriented*" (foreword). The problem with so many projects being flawed is that critics of transit have "begun to brand [TOD] a failure by critiquing the performance of flawed projects" (foreword).

The Brookings report identifies six performance criteria that can be used to evaluate the success of a TOD. This section provides a brief summary of each.

1. *Location efficiency* — allows for choice in transportation options; "Simply put, location efficiency converts driving from a necessity into an option" (p. 9). Research has shown that residents of urban, dense neighborhoods drive less and walk and use transit more.

The following measurable outcomes are a result of location-efficient neighborhoods:

- Increased mobility choices (walking and bicycling as well as transit)
- Increased transit ridership
- Good transit connections to the rest of the city and region
- Reduced auto use and reduced auto ownership

¹ Belzer and Autler 2002; hereafter "the Brookings report."

- Reduced transportation costs to individuals and households
 - Sufficient retail development (quantity, quality, and diversity) to satisfy the basic daily needs of residents and employees working in the area
 - Ability to live, work, and shop within the same neighborhood (p. 10)
2. *Value recapture* — residents of location-efficient neighborhoods spend less on transportation compared with residents of conventional automobile-dependent suburbs. “Overall, residents of denser, more transit-rich metropolitan areas pay less for transportation than their counterparts in auto-dependent metropolitan regions — even when the cost of public investments in transit is included in the calculation” (p. 10). Location-efficient mortgages (LEMs) are a new policy tool being used by Fannie Mae in selected regions to enable residents living within walking distance to a transit station to borrow more for home loans because they have lower transportation costs, and thus more disposable income.

Measurable outcomes include:

- Increased homeownership rates, especially among borderline income groups
 - Increased use of LEMs
 - The creation of housing units with lower-than-average parking ratios
 - Reduced individual and community spending for transportation (p. 12)
3. *Livability* — although difficult to measure, TODs ought to foster an environment that people enjoy. Benefits for quality of life are often difficult to measure. The Brookings report suggests:
- Improved air quality and gasoline consumption
 - Increased mobility choices (pedestrian friendliness, access to public transportation)
 - Decreased congestion/commute burden
 - Improved access to retail, services, recreational, and cultural opportunities (including opportunities for youth to get involved in extracurricular activities within the neighborhood)
 - Improved access to public spaces, including parks and plazas.
 - Better health and public safety (pollution-related illnesses, traffic accidents)
 - Better economic health (income, employment) (pp. 12–13)
4. *Financial return* — TODs must be successful in economic terms. “All investors, whether public or private, expect some type of return” (p. 13). Mixed use and diverse environments also help to provide for more economic stability. Although land development is always a financial risk, the return on investment must be the result of a balance between achieving the “highest and best” use of the land without jeopardizing the elements that lead to a successful TOD. The public sector can reap financial returns through value capture and other mechanisms that provide the ability

to gain both short- and long-term value. Businesses willing to be located near a transit stop also can provide incentives to their employees to use transit, including free passes as an alternative to free parking.

Some measures of financial return include:

- For local governments: higher tax revenues from increased retail sales and property values
- For the transit agency: increased fare box revenues and potential ground lease and joint development revenues. It is possible that in some cases increases in land value could cover a significant portion of the cost of transit investments
- For the developer: higher return on investment
- For employers: shorter and more predictable commute times, easier employee access
- A balance between financial return and other goals of TODs, so that projects are not judged purely on their monetary return (p. 14)

5. *Choice* — while suburban development affords a lack of choice (e.g., housing types, places to shop, modes of transportation), TODs allow for more choice:

Those who don't understand TOD sometimes describe it as an attempt to "force" people to live in high-density apartments and take transit. This is simply not the case. TOD involves function far more than form, meaning that no particular housing type needs to dominate TOD projects. ... Although a certain minimum overall density is certainly a prerequisite for making TOD work, it is not true that TOD will necessarily require everyone to live at higher densities than they already do. (p. 14)

Some possible measures for choice include:

- A diversity of housing types that reflect the regional mix of incomes and family structures.
- A greater range of affordable housing options.
- A diversity of retail types. Diversity will necessarily be limited by the market area and the particular desires of the residents; however, this outcome could be measured in terms of how well the retail mix meets the needs and desires of the residents as they themselves define them.
- A balance of transportation choices (p. 15)

6. *Efficient regional land use patterns* — automobile dependence and suburban sprawl have led to the inefficient use of limited resources. In most metropolitan areas of the United States, land is being urbanized at a rate faster than new residents. Some areas have even continued to consume land while their population has shrunk. TOD implemented on a regional scale can help to reverse this trend. "[TOD] can foster much more efficient patterns and cut down on traffic generation" (p. 16). The

problem in the United States that this development pattern has not been implemented on a large scale. “Yet the efficacy of such projects is limited by the fact that they remain relatively isolated examples that are not necessarily tied into a cohesive regional system” (p. 16).

Possible measures include:

- Less loss of farmland and open space
- More suitable regional and subregional balance between jobs and housing
- Shorter commutes
- Less traffic and air pollution
- Station areas as that can serve as destinations as well as origins (pp. 16–17)

Next, the Brookings report identifies six challenges for TOD:

1. No universal working definition of TOD exists. Often, the actors engaged in TOD projects bring different goals to the table, pursue strategies that work at cross-purposes to each other, and lack unifying policy objectives.
2. TOD must deal with the tension between nodes and place. That is, it must achieve a functional integration of transit and the surrounding uses.
3. Planners have few guidelines for translating the concept of location efficiency into concrete prescriptions for TOD in different settings. What makes a place has not been codified.
4. TOD requires synergy among many different uses and functions, but this synergy is extremely difficult to achieve. As a result, TOD almost always involves more complexity, greater uncertainty, and higher costs than other forms of infill development.
5. TOD typically occurs in a very fragmented regulatory and policy environment. There is no comprehensive plan or vision, and many local governments suffer from a significant leadership gap.
6. Transit alone does not drive real estate investment when other conditions — particularly market conditions — are not supportive (pp. 19–25)

Finally, the Brookings report identifies a number of recommended actions to help make TOD a more mainstream development paradigm. These actions are targeted toward several different audiences, including a TOD-related development intermediary, transit agencies, local government, developers and lending institutions, and community organizations.

Recommendations for a TOD-Related Development Intermediary:

1. Action 1(a): Establish a “TOD Fund” to financially support TOD projects that cannot obtain conventional funding.
2. Action 1(b): Provide technical assistance to local governments, transit agencies, and developers implementing TOD projects.

3. Action 1(c): Create a typology of TOD projects appropriate for different types of stations in different contexts, as well as performance criteria for each project type.
4. Action 1(d): Develop and disseminate materials to showcase examples of the benefits of these TOD goals and the ways in which they can be realized.
5. Action 1(e): Help develop and promote appropriate parking standards and educate actors about parking reduction strategies.
6. Action 1(f): Work with lenders and secondary markets to understand ways to standardize lending strategies for TOD. (pp. 29–31)

Recommendations for Transit Agencies:

1. Action 2(a): Participate in planning for both transit agency property and the wider station area with the aim of fostering long-term rather than short-term value. Use transit agency resources to support this long-term value.
2. Action 2(b): Create station-access plans that recognize the critical link between the station and its adjacent land uses, as well as the need for the station to be an integral part of the larger area.
3. Action 2(c): Plan for TOD at the system-wide scale, assessing opportunities at each station site and thinking regionally about the interplay between land uses around each station and the way they can affect the system-wide ridership. (pp. 31–32)

Recommendations for Local Government:

1. Action 3(a): Establish TOD area plans around all transit stations.
2. Action 3(b): Develop a process for interagency coordination with the transit operator(s) who will be involved in TOD projects to ensure that such projects will both achieve the goals of TOD and move forward expeditiously.
3. Action 3(c): Create comprehensive parking strategies for TOD projects that include comprehensive management and that “unbundled” parking from other land uses..
4. Action 3(d): Provide financial and land assembly assistance to transit agencies and/or developers as an incentive for creating optimal TOD projects, including identifying new revenue streams to support bond financing.
5. Action 3(e): Establish explicit policies for incorporating mixed-income housing in TOD projects. (pp. 32–34)

Recommendations for Developers and Lending Institutions:

1. Action 4(a): Become educated about the financial structure and performance of existing TOD and appropriate mixed-use projects.
2. Action 4(b): Use phasing and design flexibility in projects to demonstrate market viability, examine assumptions, and allow for the evolution of TOD over time.
3. Action 4(c): Revise underwriting practices that require standard parking ratios for TOD projects.

4. Action 4(d): Create loan guarantee pools to help transit-oriented retail projects get financing, especially those in revitalizing of inner city areas. (pp. 35–36)

Recommendations for Community Organizations:

1. Action 4(a): Become active in planning activities sponsored by local governments and transit agencies around transit stations.
2. Action 5(b): Advocate for mixed-income housing and recognize the benefits of mixed use and location efficiency as part of an affordable housing strategy. (p. 36)

SELECTED SUMMARY OF *TRANSIT ORIENTED DEVELOPMENT AND JOINT DEVELOPMENT IN THE UNITED STATES: A LITERATURE REVIEW*

The TCRP report² contains four main chapters that address institutional issues, the evaluation of impacts and benefits, implementation, and design. Unlike the Brookings report, which provides many recommendations, the TCRP contains a more detailed summary of existing literature — without as many recommendations for future actions.

Similar to the Brookings report, the TCRP report acknowledges the difference between transit-oriented and transit-adjacent development (TAD). “A TAD is just that — development that is physically near transit; it fails to capitalize upon this proximity, however, to promote transit riding. A TAD lacks any functional connectivity to transit — whether in terms of land use composition, means of station access, or site design. A number of U.S. TODs discussed in the literature more closely resemble TADs” (p. 5).

The TCRP report also addresses the issue of transit-joint development (TJD). A TJD is “any formal agreement or arrangement between a public transit agency and a private individual or organization that involves either private-sector payments to the public entity, or private-sector sharing of capital costs in mutual recognition of the enhanced real estate development potential or market potential created by the siting of a public transit facility” (Landis et al. 1991; quoted in TCRP report, 6). The main idea of a TJD is a *quid pro quo*. The developer benefits due to accessibility advantages to the transit station that yield higher rents and/or greater occupancy. Gains in ridership and the sharing of construction costs are two examples of how the transit agency benefits.

Institutional Issues

Community collaboration, community outreach, normative roles for transit agencies, municipalities, and developers are the subject of institutional issues in the TCRP report. In this chapter, “case studies have been turned [*sic*] to probing the institutional and organization contexts of TOD and TJD” (p. 9).

The report focuses upon the need for collaboration to achieve success: “Experiences show that successful TOD and TJD typically involve carefully crafted collaborations between the many individuals, organizations, and institutions with vested interests in outcomes, including developers, planning organizations, and public-interest groups” (Knight and Trygg 1977, Porter 1997, and Cervero 1998, quoted in TCRP report, 9).

The report identifies obstacles that make public involvement necessary (Porter 1997):

1. Locational liability. Transit systems have rarely been set up to maximize development potential
2. Real-estate market cycles

² Cervero, Ferrell, and Murphy 2002; hereafter “the TCRP report.”

3. Nonsupportive government policies such as exclusionary zoning, lot-size restrictions, and suburban-like building codes
4. Institutional barriers, including the fact that cross-jurisdictional cooperation is often necessary but difficult to achieve
5. A “fixation on automobile-oriented design.” Most rail systems prioritize park-and-ride lots over passenger-generating land uses near station. (p. 9)

In order to overcome obstacles, collaboration is essential. Banks, local governments, transit agencies, and developers must all work in a flexible manner to build a successful TOD. The TCRP report provides many case examples and discusses the role of the federal, state, local government, regional planning, redevelopment agencies, and transit agencies.

Government Roles

Federal Roles

The main responsibility of the federal government is to provide funding for TOD. The Transportation Equity Act for the 21st Century (TEA 21) allocated approximately \$36 billion to transit from 1997 to 2003, which accounts for 18 percent of all federal transportation funding. Through programs such as the Transportation and Community and Systems Preservation Pilot Program (TCSP), the federal government can help promote the collaboration among state government, municipal governments, and transit agencies. In New Jersey, the Transit-Friendly Communities program, led by NJ Transit, is a good example.

State Roles

“Several state agencies have aggressively promoted TOD, usually through pro-TOD policy in state plans and key policy documents” (Porter 1997; quoted in TCRP report, 14). The California Transit Village Act encourages municipalities to direct intensive development around train stations. In Oregon, a transportation planning rule requires all of the state’s metropolitan planning organizations “to design regional transportation plans that are capable of reducing per capita vehicle-miles-traveled (VMT) by between 5 and 10 percent within a twenty year period” (p. 14). Florida, in 1993, “exempted urban infill and redevelopment areas from level-of-service standards and required that local comprehensive plans incorporate multimodal transportation elements, including Transportation Demand Management (TDM) measures” (Ewing 1997; quoted in TCRP report, 14).

Local Government Roles

Land use decisions are made at the local level; therefore, TOD is influenced by municipal government far more than any other entity. “Local governments can show their support for TOD through general plans, transportation plans, station-area plans, and special

zoning provisions” (Porter 1997; quoted in TCRP report, 15). Station area plans often include the following elements:

- Results of a market feasibility study
- A physical plan for streets, pathways, utilities, mitigations, and community enhancement
- A land use plan
- A staging plan
- Regulatory and fiscal incentives (pp. 15–16)

Transit Agency Roles

An important recommendation is for the multiple public agencies to form partnerships to promote TOD and TJD:

This partnership approach is recommended by White and McDaniel (1999), who call for transit agencies to enter into cooperative (“CO-OP”) agreements for TJD projects. The idea is to combine the strengths of multiple governmental entities under a single operating umbrella. The key activities that might be consolidated from multiple agencies under a CO-OP agreement include:

- Site assemblage
- Flexibility (or relaxation) of zoning
- Zoning incentives
- Low-cost financing (through tax-exempt financing, sale-leaseback, lease or loan guarantees, federal grants)
- Provision of infrastructure
- Improved coordination between governmental entities
- Expedited processing
- Land use coordination
- Establishment or creation of a growth center and, to an extent, a captive market of transit riders (p. 19)

Parking or TOD?

The TCRP report only briefly addresses the issue of parking, one of the largest obstacles facing TODs:

Accommodating commuter parking demand often results in a transit station platform surrounded by a sea of parking. This has limited opportunities for TOD in several ways: First, the parking separates the transit system from the adjacent community along with potential TOD parcels. Second, the parking creates an automobile oriented environment, rather than the pedestrian environment that is essential for [TOD]. Third, the need for significant parking leads to siting stations in locations that are

not conducive to TOD. Finally, regulatory requirements for replacement parking severely limit the possibility of converting commuter parking into TODs. . . . Replacement parking requirements have placed a higher value on the short-term ridership generated from park-and-ride than the long-term benefits that are realized through creating communities around transit stations. (p. 25)

Three examples are discussed, in Dallas, Denver, and Portland. The first two have emphasized the need for commuter and user parking in their TODs, while Portland has promoted reduced parking ratios in station areas.

Evaluation of Impacts and Benefits

In this chapter of the TCRP report, the impacts of TOD and TJD are described as falling into one of two categories. The first is the “impacts of public policies,” and the second is the “impacts on public and private outcomes.” The report looks at several federal, state, and local policies that attempt to promote TOD.

Federal, State, and Local Policies

The TCRP report describes the Federal Transit Administration’s (FTA’s) New Joint Development Policy, Livable Communities initiatives, the Transportation and Community and System Preservation Pilot Program, and the New Starts Criteria in explaining how these policies help to promote TOD.

Next, the report describes the California Transit Village Development Planning Act. This act (which will be discussed in more detail in the following section) seeks to “promote the adoption of Transit Village Plans. . . . The Act further stipulates that no public workers projects [*sic*], tentative subdivision maps, or parcel maps may be approved, nor zoning ordinances adopted or amended, within an area covered by a transit village plan unless the map, project, or ordinance is consistent with the adopted transit village plan” (p. 32). (See Appendix 1 for the text of this act.) The report also briefly mentions the purpose of the NJ Transit Villages Initiative but does not go into any details of the program.

The last part of this section describes local and regional ordinances to promote TOD in Portland, San Diego, and San Francisco.

Private-Sector Benefits

Next, the TCRP report provides the results of a growing body of literature on the impacts of TOD upon the private sector. The best summary of this literature can be shown in Table 1, which is taken from a recent study from the Great American Station Foundation (2001). This table quantifies the added economic benefits based upon city size.

Table 1. Economic Benefits of Station Revitalization

City Size	Increased Employment	Increased Household Income	Increased Property Values (in millions)	Increased Property Tax (in millions)
Town	45-325	\$80-\$345	\$5-\$60	\$.25-\$3.0
Very Small City	115-825	\$85-\$460	\$10-\$65	\$.5-\$3.25
Small City	170-975	\$140-\$575	\$15-\$90	\$.75-\$4.5
Medium City	190-1,025	\$155-\$870	\$15-\$150	\$.75-\$7.5
Large City	260-1,435	\$175-\$1,055	\$25-\$205	\$1.25-\$10.25
Cities sizes are defined as follows: Town (less than 50,000 population) Very Small City (50,000 to 100,000 population) Small City (100,000 to 250,000 population) Medium City (250,000 to 500,000 population) Large City (500,000 to two million population). Cities with population exceeding two million were excluded from the analysis.				

Source: Great American Station Foundation (2001); reproduced in TCRP report, p. 38.

Public-Sector Benefits

The report next discusses public-sector benefits, which includes a look at increases in transit ridership.

- In the case of the San Francisco Bay Area, those living near transit were generally three to four times as likely to commute via transit as other residents.³
- Research from metropolitan Washington, D.C., and Toronto found transit market share to be over half of all commute trips made by apartment-dwellers living near rail stops.⁴
- A recent survey found nearly 80 percent of residents living near the Portland MAX Orenco station stated their transit usage had increased since moving into their new residence.⁵
- A study of Santa Clara County’s [California] light-rail corridor found TOD residents patronized transit as their predominant commute mode more than five times as often as residents countywide; self-selection was evident in that 40 percent of the respondents who moved close to transit stops said they were influenced in their move by the presence of LRT [light-rail transit].⁶ (39–40)

Other public-sector benefits of TOD, which are difficult to quantify, include increases in air quality, energy conservation, and social equity.

³ Cervero 1994.

⁴ JHK and Associates 1987, 1989; Stringham 1982.

⁵ Arrington 2000.

⁶ Gerston & Associates 1995.

Implementation

The next chapter of the TCRP report discusses issues related to TOD and TJD implementation. The first point in the report is that TODs can only be created when the market allows for such development. “A body of research and empirical evidence has shown that TOD and TJD cannot overcome a flat or anemic local real-estate market” (p. 44).

Supportive Public Policies

At times, even when the market is good, the creation of a TOD required the assistance of government support. The report discusses a number of methods in which local government can help promote TODs. Incentives include:

Finance and Tax Policies

- Grants
- Sliding-scale impact fees
- Tax abatement
- Creative financing
- Direct financial participation
- Tax increment financing
- Benefits assessment districts
- Empowerment zones and enterprise communities
- Loans (pp. 46–52)

Land-Based Initiatives

- Land assembly
- Land swaps
- Land banking
- Sale or lease of development rights (pp. 53–55)

Zoning and Regulations

- Incentive zoning (e.g., density bonuses)
- Performance zoning (e.g., tying incentives to meeting minimum criteria)
- Inclusionary zoning (e.g., to encourage mixed uses)
- Interim zoning (to prevent auto-oriented uses from precluding eventual TOD)
- Floating zones (to allow flexibility in where desired uses go)
- Planned unit developments
- Specific plans
- Transfer of development rights (pp. 56–59)

Complementary Infrastructure

Before private capital will come to depressed urban districts, substantial improvements are often necessary not only to enhance a neighborhood's appearance and capacity for growth but also to demonstrate a *bona fide* public commitment to turning an area around. (p. 60)

Examples in California show that improvements such as new drainage, water systems, placing utilities underground, parkland, pathways, landscaping, and street-lighting upgrades have all attracted private investment in the TODs.

Procedural and Programmatic Approaches

- Streamlining development review
- Remediation of brownfields
- Resource sharing
- Siting of government facilities
- Transportation demand management (pp. 61–64)

Barriers and Constraints

Similar to the Brookings report, the TCRP report touches upon barriers and constraints to TOD development. These include fiscal barriers, political barriers, and organizational barriers, but this report provides anecdotal information about the experiences of difference places and does not provide a list of goal and objectives to overcome these in the same way as does the Brookings report.

Urban Design

The last chapter of the TCRP report discusses the importance of urban design, including principles such as mixed use and density. The report highlights the importance of local context and identifies a typology to classify TODs as being urban or neighborhood based:

- *Urban TODs*, which are located along major transit lines and feature “high commercial intensities, job clusters, and moderate to high residential densities.”
- *Neighborhood TODs*, which are located along feeder bus routes and typified by “a residential and local-serving shopping focus,” with some mix of service, entertainment, civic, and recreation uses. (Calthorpe 1993; quoted in TCRP report, 76)

The chapter includes a detailed look at land use mixes (e.g., percentage and square footage of land uses based on size and typology), and design quality, including street layout, building orientation, and floor-area ratios.

SELECTED SUMMARY OF STATEWIDE TRANSIT ORIENTED DEVELOPMENT STUDY: FACTORS FOR SUCCESS IN CALIFORNIA

The California report⁷ states: “The main objective of this study is to define strategies that the State of California could undertake to encourage the broader implementation of TOD near major transit stations: bus, rail, and ferry” (p. v). This report summarizes major barriers to TOD implementation, looks at case examples of “lessons learned,” and identifies strategies that could help overcome barriers. The California Statewide TOD Technical Advisory Committee defines TOD as “moderate to higher-density development, located within an easy walk of a major transit stop, generally with a mix of residential, employment and shopping opportunities designated for pedestrians without excluding the auto. TOD can be new construction or redevelopment of one or more buildings whose design and orientation facilitate transit use” (p. 12).

The State of California has been a leader in promoting development around transit. The Transit Village Development Planning Act, enacted in 1994, authorizes municipalities to create land use plans around major transit stations, which include density bonuses over local zoning regulations. In this act, cities or counties have the ability to create transit village plans to set up a transit village development district that not only aims to center development on the station for increased transit use but also seeks to create affordable housing and to promote economic and community development, in addition to promoting sustainable environmental objectives. Once a district and plan is formed, the city or county is eligible for transportation funding. (See Appendix 1 for a copy of the Transit Village Development Planning Act of 1994.)

Components of Successful TODs

The California report begins by outlining the important design aspects of TOD. They rely on NJ Transit’s *Planning for Transit-Friendly Land Use: A Handbook for New Jersey Communities* (1994), which states that TODs should contain the following design features:

- A transit station or stop that is a visible point of identity for the neighborhood, district, or community it serves
- Access to the transit station or stop that is along clear, direct, and convenient routes
- Continuous and safe sidewalks and pathways that make pedestrian access easy
- Bike paths and storage locations that encourage bicycle access
- Safe and comfortable places to wait and to meet others
- Major points of origin or destination for transit riders that are in easy and interesting walking distance of the transit station or stop
- A mix of land uses, including retail, housing, and/or offices and other employment centers and perhaps also such special uses as governmental offices, schools and health care facilities, or tourist or recreation locations

⁷ California Department of Transportation 2002a; hereafter “the California report.”

- Essential services and conveniences that are located in, or in close proximity to, the transit station, such as a day care center or dry cleaning shop, facilitating “trip-linking” and thus eliminating the need to make additional stops during the trip
- Safe, well-lit, attractive areas for all-day parking, drop-off and pick-up, and direct transfer between modes of transit
- An overall environment that is active, human scaled, and visually diverse and interesting, where people are encouraged to walk (pp. 15–16)

Similar to the Brookings report and TCRP report, the California report discusses the difference between TOD (pedestrian friendly) and TAD (non-pedestrian friendly). In order to change a TAD into a TOD, the following criteria must be met:

- A compact site design (possibly a redevelopment plan), oriented for the pedestrian
- Higher-density and intensity of uses, in relation to the norm for the community
- Buildings oriented to transit, [with entrances] located convenient to a transit stop
- Limited parking, the parking supply has been “pinched” or placed in multilevel parking structures
- Pedestrian access and high-quality, safe facilities (pp. 16–17)

Federal Rail Transit Funding Criteria

The FTA, in 1997, implemented evaluation criteria for transit-supportive land uses in order to determine which projects would be awarded Federal “New Starts” funding.

The framework looks at three levels, including (1) containment of sprawl at a regional scale, (2) focus of development growth on the transit corridor, and (3) transit-friendly zoning with a mix of uses, pedestrian scale, increased density, and parking limits in station areas. The FTA measures eight performance factors on a sliding scale to determine a rank:

1. Existing land use
2. Containment of sprawl
3. Transit-supportive corridor policies
4. Supportive zoning near transit stations
5. Tools to implement land use policies
6. Track record of performance
7. Performance of land use policies
8. Existing and planned pedestrian facilities, including access for persons with disabilities (p. 19)

TOD Evaluation Checklist

Next, the California report recommends a “checklist of attributes of TOD ... for use by local jurisdictions and transit agencies, developers, and others in evaluating whether a project or plan conforms to criteria for TOD” (p. 20). The evaluation should be made within a half-mile of the station.

Land Use

- ❑ Are key sites designated for “transit-friendly” uses and densities (walkable, mixed-use, not dominated by activities with significant automobile use)?
- ❑ Are “transit-friendly” land uses permitted outright, not requiring special approval?
- ❑ Are higher densities allowed near transit?
- ❑ Are multiple compatible uses permitted within buildings near transit?
- ❑ Is a mix of uses generating pedestrian traffic concentrated within walking distance of transit?
- ❑ Are auto-oriented uses discouraged or prohibited near transit?

Site Design

- ❑ Are buildings and primary entrances sited to be easily accessible from the street?
- ❑ Do the designs of areas and buildings allow direct pedestrian movements between transit, mixed land uses, and surrounding areas?
- ❑ Does the site’s design allow for the intensification of densities over time?
- ❑ Are the first-floor uses “active” and pedestrian oriented?
- ❑ Are amenities provided to help create a pedestrian environment along and between buildings?
- ❑ Are there sidewalks along the site frontage? Do they connect to sidewalks and streets on adjacent and nearby properties?
- ❑ Are there trees sheltering streets and sidewalks? Pedestrian-scale lighting?

Street Patterns and Parking

- ❑ Are parking requirements reduced in close proximity to transit, compared to the norm?
- ❑ Is structured parking encouraged rather than surface lots in higher-density areas?
- ❑ Is most of the parking located to the side or to the rear of the buildings?
- ❑ Are street patterns based on a grid/interconnected system that simplifies access?
- ❑ Are pedestrian routes buffered from fast-moving traffic and expanses of parking?
- ❑ Are there convenient crosswalks to other uses on- and off-site?
- ❑ Can residents and employees safely walk or bicycle to a store, post office, park, café, or bank?
- ❑ Does the site’s street pattern connect with streets in adjacent developments?

Benefits of TODs

The next chapter in the California report identifies the social, economic, and environmental benefits that can result from TODs. The first two are quality of life and enhanced mobility. As mentioned in the Brookings report, while it is difficult to measure ‘livability,’ it is easier to quantify mobility (see p. 4 of the present report). Table 2 describes the mobility benefits of transit-friendly station areas compared to other areas. This was conducted in Portland, Oregon, in 1994 by the regional government, Metro.

Table 2. Metro Travel Behavior Survey Results for Portland, Multnomah County, Oregon

Land Use Type	Mode Share					VMT per Capita	Autos per Household
	% Auto	% Walk	% Transit	% Bike	% Other		
Good Transit & Mixed Use	58.1	27	11.5	1.9	1.5	9.80	0.93
Good Transit Only	74.4	15.2	7.9	1.4	1.1	13.28	1.50
Rest of Multnomath County	81.5	9.7	3.5	1.6	3.7	17.34	1.74
Rest of Region	87.3	6.1	1.2	0.8	4.6	21.79	1.93

Source: Metro 1994 Travel Behavior Survey; reproduced in California Department of Transportation 2002a, p. 24.

A major benefit of TOD is that it “can help reduce infrastructure costs for local governments by up to 25 percent through compact and infill development. ... A review of the literature indicates that contiguous, compact development is generally associated with infrastructure costs that are 75–95 percent of those for dispersed development patterns (e.g., 5–25 percent lower)” (p. 27).

TODs may also be used to promote middle-class and affordable housing:

TOD can contribute to the supply of affordable housing by offering lower-cost housing products and by reducing household transportation expenditures. In addition, by bringing jobs and housing closer together, TOD can help address the growing “jobs/housing balance” problem, which forces many workers to commute to distant job centers and reduces employment opportunities for transit-dependent workers. Finally, TOD can promote urban renewal and provide reverse commute opportunities from cities to the suburbs. (pp. 29–30)

Ultimately, one of the major benefits of TOD is that compact development reduces both public and private infrastructure costs per housing unit. As the supply increases, these savings can translate into reduced housing costs.

Economic development is another reason for TOD:

TOD can be a focus of economic investments, so that scarce funds are used efficiently and effectively. By offering viable transportation alternatives for workers, TODs can help to reduce the amount of time that some workers spend in traffic, and also help to reduce congestion-related business costs. Furthermore, TOD can increase business opportunities, and can be used as a tool to create distinctive, marketable communities with higher property values and tax revenues. (p. 33)

Many studies all point to increased land values in places with better pedestrian and transit facilities. The Real Estate Research Corporation (RERC) states that over the next 25 years, property values will increase the fastest in “smart communities.” The RERC defines a smart community as one that incorporates the traditional characteristics of

cities, including mixed-use and pedestrian friendly environs (ERE Yarmouth & the Real Estate Research Corporation 1998; quoted in California Department of Transportation 2002a, p. 36).

Some of the findings of studies about transit and property value include (see Appendix 2 for a summary of studies on rail transit's effect on property values):

- Price per square meter for commercial property falls by \$75 for each meter away from transit stations. Prices rises by \$443 for locations within special public interest districts.⁸
- Price per square foot for commercial property decreases by about \$2.30 for every 1,000 feet further from station.⁹
- In Los Angeles, from 1980 to 1990, commercial space within a half-mile of a rail corridor sold for \$31 per square foot more, on average, than comparable space outside the rail corridor.¹⁰
- In San Diego, home sale prices increased by \$272 for every decreased of 300 feet from a light rail station.¹¹
- In San Jose, home sale prices increased by \$197 for every decrease of 100 meters to a light rail station.¹¹
- In Santa Clara County, office space within a quarter-mile of a transit station sold for \$4.87 per square foot more, on average, than comparable space more than three-quarters of a mile from a station.¹²

TODs can also result in enhanced public safety “by creating places that are busy through the day and evening. By including more and higher quality facilities for pedestrians and bicyclists, TOD increases safety for these modes of travel. Furthermore, by offering pleasant and viable alternative modes of travel, TOD can help to reduce rates to driving injuries and deaths” (p. 36). The California report does not provide numerical evidence to support this claim, but it discusses how public safety is promoted through walking, bicycling, and transit use.

Environmentally, “TOD can help to reduce the number of vehicle trips and vehicle miles that households travel by automobile, thereby reducing the rate of increase in regional air pollution levels, conserving energy and reducing the amount of greenhouse gases emitted into the atmosphere” (p. 39). The report provides case examples of TODs that have generated less air pollutants than conventional development. Finally, the report discusses the potential land conservation benefits of TOD through more compact and mixed-use development.

⁸ Lewis-Workman and Brod 1997.

⁹ FTA 2000.

¹⁰ Fejarang 1994.

¹¹ Landis, Cervero, et al. 1995.

¹² Weinberger 2001, 2000; Cambridge Systematics, Inc. 1999.

TOD and Travel Behavior

The third chapter of the California report summarizes the available information on the influence of TOD on people's travel behavior. As congestion becomes worse in cities, transit solutions, including TOD become more important. The problem is that not much data have been collected to determine the impact of TOD on travel behavior:

Although numerous studies have been conducted on neighborhoods that resemble TODs in California and elsewhere in the United States, few recent or conclusive studies have been conducted to date on the relationships between actual TODs and travel. One reason for this is that too few newly-built TODs have been in existence long enough for solid research to occur. (p. 47)

A summary of each study that has been conducted includes the following findings:

- Pushkarev and Zupan recommend an average minimum of 15 dwelling units per residential acre for frequent bus service and a minimum of 9 dwelling units per residential acre along a 25- to 100-square-mile corridor for light rail service.
- The Institute of Transportation Engineers (ITE) recommends an overall minimum of 9 dwelling units per acre, and/or 35 to 50 million square feet of commercial or office space, for light rail and feeder buses.
- In a 1996 TCRP study (Transit and Urban Form), a 10 percent increase in population density was associated with a 5 percent increase in station area transit boardings. It also found that a 10 percent increase in employment density was associated with a 2 percent increase in transit ridership.
- Cervero's analysis of travel in relation to office use, found that four variables — proximity to a transit station, employment density, commuting behavior at employee's prior job, and occupation — explained 92 percent of the variation in transit modal split.
- Cervero and Kockelman performed a unique analysis to determine how density, design, and diversity (the "3Ds") are related to VMT and to travel by means other than the private automobile. They concluded "higher densities, diverse land uses, and pedestrian-friendly designs ... must co-exist to a certain degree if meaningful transportation benefits are to accrue" (Cervero and Kockelman 1997; quoted in California Department of Transportation 2002a, 57).
- A study of twelve neighborhoods in Seattle shows that those with traditional grid plans have substantially more pedestrian traffic than neighborhoods with suburban layouts. This study chose places with similar population densities, land use mix, and incomes but that differed based on street layout. (pp. 48–58)

Parking and TOD: Challenges and Opportunities

In tandem with the final California report but in a separately published volume, California DOT looked at the important issue of parking (California Department of

Transportation 2002b): “This special report is intended to provide information to local jurisdictions, transit agencies, developers, financial institutions, and others as they develop and implement parking standards and programs for [TOD] in California. It provides an overview of available information regarding the extent to which parking for various types of land uses may be reduced in the vicinity of major transit station” (p. 1).

The parking volume of the California report documents how TOD provides shared parking opportunities, through the nature of mixed land uses. The report advocates less-than-normal parking standards near the station to help promote the use of transit. The report says, “If the design and location of TODs enables a reduction in the number of parking spaces needed, the cost savings can be significant. Reduced parking requirements can lower TOD construction costs, which in turn can make housing more affordable and/or allow more development to be built on sites near transit” (1). It also states that reduced parking requirements can

- Reduce residential parking rates
- Reduce office/commercial rents
- Lessen urban water runoff
- Reinforce/encourage transit use
- Increase taxable square footage
- Improve local traffic circulation
- Improve urban design
- Generate congestion management credits for businesses (where applicable) (pp. 1–2)

The research summarized in this special report indicates that TOD can potentially reduce parking per household by approximately 20 percent, compared to non transit-oriented land uses. A wide range of parking reductions (from 12 to 60 percent) has also been found for commercial parking in TODs. To date, however, there are no clear conclusions regarding how much parking may reasonably be reduced for any particular TOD. Therefore, parking needs must be calculated on a site-by-site basis. (p. 2)

Residential Parking

The first finding about residential parking is based on a study of California done by Cervero (1994). Between 1985 and 1994, he surveyed over 6,500 housing units in 26 large housing projects built within a quarter-mile of urban rail stations, most being multifamily buildings with densities of 20 to 60 units per acre. His findings were:

- Most TOD residents are young professionals, singles, retirees, childless households, and immigrants from foreign countries.
- These groups tend to require less housing space than traditional nuclear families and are more likely to live in attached units for financial and convenience reasons, regardless of where the units are located.

- Most TOD residents tend to work downtown and at other locations that are well served by transit. (p. 4)

In a more detailed analysis of 12 housing projects near San Francisco' Bay Area Rapid Transit (BART) stations, Cervero found that TODs had an average of 1.66 people and 1.26 vehicles per household, compared to 2.4 people and 1.64 vehicles for all households located in the same census tracts. Whereas only 48 percent of all households in the census tracts had fewer than two vehicles, 70 percent of TOD households had fewer than two vehicles. (p. 4)

In a study of Vancouver, British Columbia, Bunt and Associates Engineering examined 4,000 households in 60 buildings near six Skytrain stations. They found:

- Households located near stations use transit much more often than more distant households.
- Households near stations generally owned 10 percent fewer vehicles than more distant households. Frequent users of Skytrain, however, owned 29 percent fewer vehicles than households using Skytrain less frequently. The difference in Skytrain use translates directly to lower car ownership rates. (p. 5)

“Based on these finding, the City of Vancouver has since allowed parking reductions ranging from 14% to 28% for new projects in other multifamily zones near major transit stations” (p. 5).

As stated in the parking volume of the California report, the main findings of these and similar studies point to the following:

- Parking reductions (perhaps on the order of 20 percent) are more feasible for multifamily rental units with smaller households (e.g., young couples, singles, empty nesters) and where a significant share of workers is likely to use transit to get to key employment centers.
- Auto ownership rates are highly correlated with household income, as well as household size and number of workers, even where good transit service is available. (Although it is important to point out that higher-income households may also use transit frequently.)
- “Lower income” does not always mean that households do not own vehicles. For example, several TODs located in downtown Portland with significant amounts of affordable housing units, for instance, report relatively high car ownership rates. (pp. 5–6)

Due to these factors, it is possible to state that TOD projects that primarily include higher-income groups and/or owner-occupied multifamily dwellings may not be able to reduce parking as much as TODs that incorporate numbers of lower-income households and/or rental units. (p. 6)

Commercial Parking

“Compared to the topic of residential auto ownership rates, no studies available in the literature have systematically estimated optimal office or retail parking requirements while accounting for level transit service across several locations” (p. 7). Although not much has been done to quantify the relationship between commercial parking and TOD, Table 3 summarizes parking reductions at selected TODs.

Table 3. Commercial Parking Reductions at Selected TODs

TOD	Land Use	Parking Reduction
Pacific Court (Long Beach, CA)	Retail	60%
Uptown District (San Diego, CA)	Commercial	12%
Rio Vista West (Sand Diego, CA)	Retail/Commercial	15%
Pleasant Hill (CA)	Office	34%
Pleasant Hill (CA)	Retail	20%
Dadeland South (Miami, FL)	Office	38%
City of Arlington (VA)	Office	48% - 57%
Lindbergh City Center (Atlanta, GA)	Speculative Office	19%
Lindbergh City Center (Atlanta, GA)	Retail	26%
Portland Suburbs (OR)*	General Office	17%
Portland Suburbs (OR)*	Retail/Commercial	18%

*Based on maximums specified in Metro’s Title 2 Regional Parking Ratios.

Source: California Department of Transportation 2002b, 8.

Site-Specific Approaches

Next, the parking volume of the California report discusses strategies to deal with parking in the following areas:

- Mixed land uses and shared parking
- District parking and in-lieu fees
- Transportation demand management
 - Satellite parking
 - Carpool parking
 - Transit pass programs
- Hours restrictions (parking management)
- Unbundling housing and parking
- Car sharing
- Mechanized and “robotic” parking systems

City, Regional, and State Approaches

The next section of the parking volume of the California report explains the specific strategies of the City of San Diego, Metro Portland, and the State of Maryland. San Diego's Transit Area Overlay Zone allows for a small parking reduction in its areas. In Portland, the Urban Growth Management Functional Plan seeks to accomplish the goals of the 2040 long-range plan. "Title 2 of the Functional Plan includes regional policies that establish the number of minimum and maximum parking spaces that can be required by local governments for certain types of new development" (p. 22).

In Maryland, a

TOD Task Force developed a recommendation that the [state] create a program to fund parking structures and bicycle and pedestrian amenities in TODs. More specifically, the recommendation acknowledges that structured parking is necessary to promote higher density development, but that the high cost of providing structured parking acts as a financial barrier to TOD development. (p. 23)

Furthermore, the recommendations call for the following:

- Establish TOD zones to determine needs and focus incentives
- Establish more detailed eligibility requirements
- Define program parameters and roles and responsibilities of [Maryland Transportation Authority] and other potential financial partners
- Develop an award system (p. 23)

Planning for Reduced Parking

"This section of the report describes a simplified, "generic" planning process that can be customized to plan for parking in TODs" (p. 24). It draws from the handbook titled *Using Demand-Based Parking Strategies to Meet Community Goals*, which is meant to assist local government in parking management. In this handbook (see Appendix 3), a preliminary assessment can be made to determine

- Economic and financial feasibility (e.g., developers facing high costs for parking structures and underground facilities)
- Characteristics of the site and the surrounding neighborhood (e.g. transit accessibility, potential for shared facilities)
- Parking demand, supply, requirements and attitudes (e.g., are the developer, lender, and land owner willing to explore parking management options?)
- Market issues (e.g., land values are rising, but parking costs still hinder development (p. 24)

The parking volume of the California report suggests that a feasibility study be conducted for each TOD. Components should include:

- An inventory of all on and off-street parking spaces in the project
- A survey of parking charges
- Peak and off-peak occupancy counts
- Long- and short-term estimates of the mix for all of the above
- Tabulations of the amount of floor area by type of use to determine demand
- An analysis of traffic and parking impacts associated with on- and off-street parking
- Tabulations of existing and projected parking utilization rates for the area
- Number of projected employees
- Number of employees who will drive their own car to work the majority of the time
- Number of employees using transit, carpool, or alternative modes of transportation the majority of the time
- Number of employees requiring weekend parking who will drive their own cars
- Number of employees requiring weekday after-hours parking who will drive their own cars (pp. 24–25)

Barriers to Implementing TOD

In the last part of the California report, barriers to TOD implementation in the state are identified, in the following categories:

- Financial challenges
- Infrastructure costs — replacing or updating old infrastructure
- Fiscalization of land use — many believe that local government dependence on sales tax revenues from retail development in California has tended to skew land use patterns toward higher volume, more auto-oriented retail uses that are often located in outlying areas
- Obtaining development entitlements — developers and local planners interviewed for this study indicated that a primary barrier to TOD implementation is the challenge of obtaining local government entitlements (e.g., development approvals) to build TODs
- Local concerns about traffic
- Need for better data
- Parking challenges
- Land assembly
- Disposition of public land
- Use of tax-increment financing — tax increment financing is currently only a limited tool for TOD since only a few of California’s major transit stations are included within the boundaries of existing redevelopment areas
- Lack of TOD experience and coordination
- Need for better information (pp. 143–46)

What Can the State of California Do to Encourage TOD Implementation?

The final section of the California report recommends actions to encourage TOD development (these are listed in detail in Appendix 4). There are two approaches:

Strategy Area # 1: State Policies and Practices

- Encourage improved coordination of land use and transportation planning at local and regional levels.
- Facilitate the use and sale of state-owned land near major transit stations for TOD.
- Examine state environmental review requirements in relation to TOD to determine whether changes may be indicated to reduce barriers.
- Contribute to improved data on travel and economic impacts of TOD, and facilitate the use of this data in improved analysis and decision-making tools.
- Develop and provide quality information and technical assistance on TOD implementation. (p. 152)

Strategy Area # 2: State Funding for Planning and Implementation

- Provide funding to local jurisdictions to prepare plans and adopt ordinances that facilitate TOD.
- Provide financial incentives to enable local agencies and private organizations to implement TOD.
- Offer funding for identified types of TOD demonstration projects.
- Change existing laws to allow local agencies to provide “tax increment financing” around major transit station, even if they are located outside redevelopment areas.
- Allow greater flexibility in the use of state transportation funds for TOD.
- Help make private TOD mortgage instruments, such as the location-efficient mortgage program, more widely available. (pp. 152–53)

GENERAL CONCLUSIONS

In 2002, the three reports summarized above made a major contribution to the literature in the area of transit-oriented development. Conclusions from these reports are:

1. *Collaboration is key* — In order to successfully build a TOD, it is vital that not only do public and private sectors need to work together, but also different levels of government and different agencies across government.
2. *Public policies are lacking* — The TCRP report discusses case studies in a best practice manner, but the Brookings report begins to outline necessary goals and objectives for a coherent public vision. The California report takes the Brookings report's recommendations and develops a model of state policy to promote TOD.
3. *It is necessary to develop a typology and guidelines for success* — Although TOD is subject to local market constraints, it is necessary to develop a system for classifying different places and then creating guidelines for success. Future TODs should learn from the successes and/or failures of the past — it is necessary to define obstacles to success, especially in a local context.
4. *Housing, parking, and financing need special attention* — All three of these reports identify the importance of housing, parking, and financing for TODs. These issues need to be worked on in a general sense, again to develop guidelines for success, but they also need to be addressed in a local context for each new project.
5. *Measuring and evaluating success is necessary* — To ensure that TODs are successful, a process of evaluation is important to ensure that goals are being realized. As stated in the TCRP report, most TODs in the United States are so new that adequate data have not yet been collected to evaluate their success.

APPENDICES

For **Appendix 1**, please see Article 8.5, Chapter 3: Local Planning, 1998 Planning, Zoning, and Development Laws, State of California.

http://ceres.ca.gov/planning/pzd/1998/plan_3.html#plan_3

For **Appendix 2**, please see pp. 167-172 of the *Statewide Transit-Oriented Development Study: Factors for Success in California – Technical Appendix*.

<http://www.dot.ca.gov/hq/MassTrans/tod.htm>

For **Appendix 3**, please see the *Statewide Transit-Oriented Development Study: Factors for Success in California, Special Report, Parking and TOD: Challenges and Opportunities*.

<http://www.dot.ca.gov/hq/MassTrans/tod.htm>

For **Appendix 4**, please see the *Statewide Transit-Oriented Development Study: Factors for Success in California* (Statewide Final TOD Report), Chapter 9, pp. 149-191.

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