Technical Report Documentation Page

1. Report No.	2. Government Accession No	3. Recipient's Catalog No
SWUTC/12/476660-00054-1		

4. Title and Subtitle	5. Report Date
Transit Agency Strategies that Encourage Mixed Uses around Stations	August 2012
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Carol Abel Lewis, Ph.D., Sandra Onyejekwe, Darlene Collins, Kenneth McGaughay	Report 476660-00054-1

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Center for Transportation Training and Research Texas Southern University 3100 Cleburne Houston, Texas 77004	11. Contract or Grant No. DTRT07-G-0006

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Southwest Region University Transportation Center Texas A&M Transportation Institute Texas A&M University System College Station, Texas 77843-3135	14. Sponsoring Agency Code

15. Supplementary Notes

Supported by a grant from the U.S. Department of Transportation, University Transportation Centers Program.

16. Abstract

Transit-oriented development (TOD) is a mixed-use residential or commercial area designed to maximize access to public transportation that often incorporates features to encourage transit ridership. Varied interests must be represented to implement TOD. Developers present concepts and financial backing, governments create guidelines or zoning that facilitates TOD, community stakeholders voice desires about their neighborhoods and transit agencies implement the transit improvement that serves as the initial catalyst. This research focuses specifically on the role of the transit agency in encouraging development proximate to transit and investigates selected transit authorities within the United States to determine what strategies and steps they are taking to facilitate proximate desirable development around their stations.

17. Key Words	18. Distribution Statement
Transit Oriented Development, TOD, Transit Agencies, Mixed-use Communities	No restrictions. This document is available to the public through NTIS: National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161

19. Security Classif.(of this report)	20. Security Classif.(of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	46	

Transit Agency Strategies that Encourage Mixed Uses around Stations

Carol Abel Lewis, Ph.D., Sandra Onyejekwe,
Darlene Collins, Kenneth McGaughay

Research Report SWUTC/12/476660-00054-1

Sponsored by

Southwest Region University Transportation Center
The Center for Transportation Training and Research
Texas Southern University
3100 Cleburne Avenue
Houston, Texas 77004

August 2012

ABSTRACT

Transit-oriented development (TOD) is a mixed-use residential or commercial area designed to maximize access to public transportation that often incorporates features to encourage transit ridership. Varied interests must be represented to implement TOD. Developers present concepts and financial backing, governments create guidelines or zoning that facilitates TOD, community stakeholders voice desires about their neighborhoods and transit agencies implement the transit improvement that serves as the initial catalyst. This research focuses specifically on the role of the transit agency in encouraging development proximate to transit and investigates selected transit authorities within the United States to determine what strategies and steps they are taking to facilitate proximate desirable development around their stations.

EXECUTIVE SUMMARY

Transit-oriented development (TOD) refers to mixed use complexes designed to reduce the use of single occupancy vehicles by increasing the number of times people walk, bicycle, carpool, vanpool, or take the bus, street car, or rail. Varied interests must be represented to implement TOD. Developers present concepts and financial backing, governments create guidelines or zoning that facilitates TOD, community stakeholders voice desires about their neighborhoods and transit agencies implement the transit improvement that serves as the initial catalyst. The objective of this research is to focus specifically on the role of the transit agency in encouraging development proximate to transit and investigate four selected transit authorities within the United States to determine what strategies and steps they are taking to facilitate affordable, mixed use development proximate to their stations. Houston's METRO is constructing an additional 30 miles of rail; it is anticipated that some stations will be appropriate for development. Lessons learned from other transit agencies will be synthesized for transmission to Houston METRO.

The research examined ordinances and guidelines within which transit authorities work, tasks of transit agency personnel assigned to this pursuit and relevant programs and processes. Interviews were conducted with representatives from Washington D.C.'s WMATA, New Jersey Transit, Atlanta's MARTA and Los Angeles County Metro. Each agency had success with their TOD, although the formulas are non-prescriptive. Each project is individually structured. TOD funding is largely from the developers' private sources, although there has been success in New Jersey and other cities in securing grants for TOD. The developer generally takes lead in submitting the grant requests.

Transferable lessons that can be considered by METRO fall into the areas of policy, public – private partnership (PPP) strategies and mechanisms for financing projects. Public policies encourage TOD by designating land use mixes, setting reduced parking requirements, providing incentives that encourage TOD, or giving priority to joint development proposals. The City of Houston implemented a Transit Corridor Ordinance that does not designate specific uses, but provides an opportunity for developers to pursue projects more conducive to pedestrians and transit users. Public – private partnerships are often successful, but are difficult to replicate entirely due to each property's and agency's individual characteristics. Collecting examples of PPPs for ready consideration can be done.

The research shows a robust set of examples to draw experiences and knowledge for implementing TOD. An opportunity exists for METRO to work with the City of Houston to more assertively facilitate the information to developers about the Transit Corridor Ordinance. Sponsoring periodic workshops would offer the opportunity for property owners to be aware of their design options early. Perhaps the outgrowth could be more projects utilizing the provisions available in the Transit Corridor Ordinance, resulting in more transit oriented development.

TABLE OF CONTENTS

LIST OF FIGURES

Figure **Page**

LIST OF TABLES

Table **Page**

DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the acts and accuracy of the information presented herein. This document is disseminated under the sponsorship of the Department of Transportation, University Transportation Centers Program, in the interest of information exchange. The US Government assumes no liability for the contents or use thereof.

ACKNOWLEDGEMENT

The authors recognize support for this research was provided by a grant from the US Department of Transportation, University Transportation Centers Program to the Southwest Region University Transportation Center. We also thank the following individuals for their time and generosity in sharing information about their TOD experiences for this research.

Steven A. Teitelbaum, Senior Real Estate Advisor

Office of Station Area Planning and Asset Management

Washington Metropolitan Area Transit Authority (WMATA)

Ted Tarantino, Manager

Joint Development

Metropolitan Atlanta Rapid Transit Authority (MARTA)

Vivian E. Baker, Assistant Director

Transit Friendly Land Use & Development

New Jersey Transit (NJ TRANSIT)

Dr. Alexander Kalamaros, Program Manager

Joint Development

Los Angeles County Metropolitan Transit Authority (Metro

INTRODUCTION

Background

Transit-oriented development (TOD) is a mixed-use residential or commercial area designed to maximize access to public transportation and may often incorporate features to encourage transit ridership. The main purpose of TOD is to reduce the use of single occupancy vehicles by increasing the number of times people walk, bicycle, carpool, vanpool, or take the bus, street car, or rail (Moses et. al., 2009). A TOD neighborhood typically includes a centroid with a transit station or stop surrounded by relatively dense development; progressively lower-density development may spread outward from the center. Development around the transit station may be moderate to high density. Among other nomenclature for TOD communities are transit supportive development. Also used may be the term transit adjacent development; however it can represent a negative environment in that the businesses or residences are adjacent to the transit center, but with physical or psychological barriers that prohibit easy access by pedestrians.
Joint development is a related term, generally referring to collaboration between the transit agency and a private organization.

Research Objective

Varied interests must be represented to implement TOD. Developers present concepts and financial backing, governments create guidelines or zoning that facilitates TOD, community stakeholders voice desires about their neighborhoods and transit agencies implement the transit improvement that serves as the initial catalyst. The objective of this research is to focus specifically on the role of the transit agency in encouraging development proximate to transit and investigate selected transit authorities within the United States to determine what strategies and steps they are taking to facilitate proximate desirable development around their stations. The research will query ordinances and guidelines within which transit authorities work, tasks of transit agency personnel assigned to this pursuit and relevant programs and processes. Houston's METRO is constructing an additional 30 miles of rail; it is anticipated that some stations will be appropriate for development. Lessons learned from other transit agencies will be synthesized for transmission to Houston METRO.

LITERATURE REVIEW

Throughout the history of the United States, its federal, state, and local governments have successfully allocated resources that have established the nation as a global leader in areas such as economic prosperity, healthcare, technological innovation, education, transportation systems, and national security. Through strategic planning processes that engage both public and private sectors, goals have been achieved to help meet the needs of communities as well as strengthen government capacity to build, sustain, and protect society as a whole.

At the core of revitalizing and sustaining communities lies the responsibility of government and government related agencies to implement planning goals that promote economic development, community self-sufficiency, healthy environments, and a better standard of living. Efficient transportation systems play an essential role in the provision of economic and social growth through improved mobility and better accessibility to employment and business opportunities. Government transportation agencies are charged with ensuring these systems are safe and secure for the traveling public.

Transit oriented development projects in the United States were initially seen near the railroad and streetcar suburbs in the late 19th and early 20th centuries. (Mineta Transportation Institute, n.d.) The earliest known commuter rail lines were powered by steam engines that were able to achieve high sustained speeds efficiently, but were slow to accelerate; stations were several miles apart and spurred proximate communities easing access into the city from these remote communities (Konvitz, 1987).

Transit oriented development (TOD) is generally referred to as a higher-density of land uses with pedestrian priority, located within easy walking distance of a major public transit station or stop. TODs are usually expected to increase transit ridership, walking activity, mitigate sprawl, accommodate more growth, and create interesting places (Evans et al., 2007). TOD projects potentially involve a variety of land uses. At times there may be extensive involvement of transit agencies and government funding sources. Texas is largely known for its dependence on automobiles for all personal trips; several of its major cities have adopted rail transit to encourage alternate transportation modes and to improve accessibility. There are more than 100 TOD projects in the United States (Lund, 2006). TOD stakeholders may have a wide range of complementary or competing objectives that include the following:

- Increasing the opportunities for residents and workers to meet daily needs by taking transit or walking.
- Attracting new riders to public transit, including so-called *choice* riders—riders who could otherwise choose to drive.
- Shifting the transit station mode of access to be less reliant on park-and-ride and more oriented to walking.

- Reducing the automobile ownership, vehicular traffic, and associated parking requirements that would otherwise be necessary to support a similar level of more traditional development.
- Enhancing the environment, through reduced emissions and energy consumption derived from shifts in commuting, other trip making, and station access to environmentally friendly travel modes. (Evans et al., p.17-2)

TOD can occur around a light rail, heavy rail, commuter rail, or bus stop or center, a bus terminal, or even a corridor with frequent and high-quality bus service.

TOD and Joint Development (JD) Goals

Goals for TOD parallel its general purpose and target transit usage, livability measures, environmental improvement and financial areas. Cervero et al. (2004) conducted a survey of 90 public and private agencies and supplemented with 10 case studies. Within the article, they also wrote of joint development reflecting similar goals as for TOD. Figure 1 shows stated goals reflected by the respondents. Increased ridership and economic development lead the other important goals. Also, it is important that the agencies raise revenues and improve life quality through their developments. A cadre of other goals are reflected on the graphic showing the broad range of interest pursued in TOD/JD.

Joint development is different from TOD by focusing on a specific property and may have a negotiated revenue streams or designated use and air rights. Joint development mainly occurs on a transit agency's property or in its air rights.

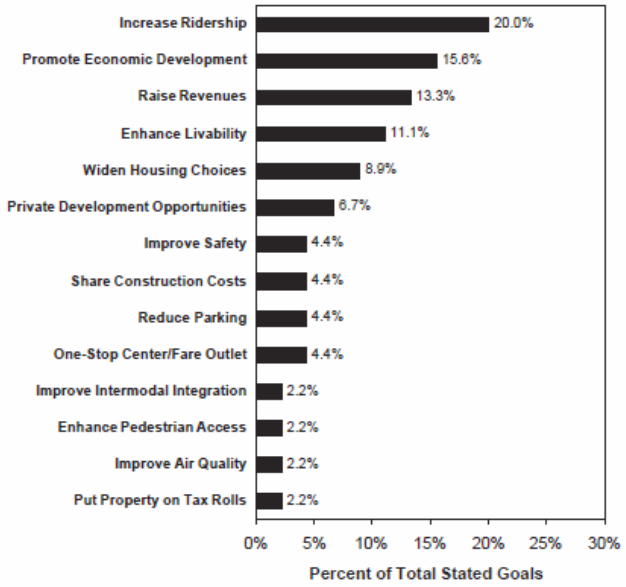

Figure 1. Relative Frequency of Stated Transit-Agency Goals for TOD Projects
Source: TCRP 102 Cervero, R. et al. (2004), p. 10.

Benefits of TOD

TOD has been identified as one way to address many of the issues plaguing large and small cities alike, including traffic congestion, loss of community, suburban sprawl, affordable housing shortages, and the general decline of inner cities. TOD has been promoted as a tool in pursuit of the difficult to define *quality of life*. Examples of benefits include reduced congestion on regional roadways, increased average vehicle occupancy, and a better and more sustainable environment. On the other hand, some authors write that TODs may actually increase congestion in the immediate vicinity of the transit station, due to higher development densities (Moses et. al 2009; AASHTO, 2006; Cervero et al. 2002). TOD works because of the relationship between transit and development. Synergy results from transit riders as they access retail, office, residential or other uses. Likewise, transit supportive land use contributes to trip generation that will support high-quality transit. TOD benefits are typically related to reduced vehicle miles traveled (VMT), increased mobility, and increased accessibility. Other benefits not related to direct transportation, but are increased public safety, better us of open space, less household income spent on transportation, and stronger tax bases. TOD also encourages mixed housing choices across a variety of incomes.

State DOT Interest in TOD

State agencies, including some state DOTs, are increasingly taking an active role in helping to plan for and promote TOD. Some of these agencies are recognizing that TOD directly supports their personal mission and goals including those to reduce congestion and improve safety. Specifically, *The Role of State DOTs in Support of Transit-Oriented Development* (AASHTO, 2006) identified well-designed transit proximate development as one solution to many of the issues plaguing large and small cities alike, including traffic congestion, loss of community, suburban sprawl, affordable housing shortages, and the general decline of inner cities. TOD has been promoted as a tool to improve living conditions for those choosing a multifaceted neighborhood.

The role of state DOTs embarking on TOD projects has historically been hampered by the complexity that land use and development plans are within the jurisdiction of local authorities. However, state DOTs are discovering that by becoming directly involved in TOD planning with regional and local agencies, as well as local communities, they are consequently able to garner support they need to successfully implement TOD projects. Below are examples of efforts state DOTs have carried out to support TOD:

- Without the coordination of the public and private sectors, successful implementation of TOD would be virtually impossible. State, regional, and local agencies partner with private entities such as developers and lending institutions to strategically implement and achieve TOD goals and objectives. The *New Jersey DOT* has partnered with ten other state agencies to prioritize state funding and technical assistance to communities that successfully planned for and implemented TOD in transit station areas.
- At the local level, lack of resources and knowledge work against TOD. By receiving much needed technical assistance, communities are able to successfully implement TOD projects. *Oregon's* Transportation and Growth Management Program provides communities with

consultants to assist in modifying development ordinances, comprehensive plans, and development review procedures.

- State DOTs can provide local transportation agencies with funds to be used exclusively for transportation improvement projects. The *Massachusetts DOT's* Infrastructure and Housing Support Program has provided local agencies with at least $30 million in financial assistance for pedestrian improvements, bicycle facilities, housing projects, and parking facilities in mixed use developments located within one-quarter mile of a transit station.
- Aimed as a tool to support the decision-making process, the *Florida DOT* is helping communities assess the benefits TOD would provide and evaluate options by sponsoring research on the impacts of TOD on transit ridership. (AASHTO, 2006)

These are but a few examples of ways state DOTs are working to support TOD. Additional activities may include; changes to TOD related policies and practices, education and outreach efforts, and making state-owned land available for mixed-use development. The ways to support the implementation of TOD may vary according to the needs of each community, but the end result should be the same – enhanced opportunities for employment, homeownership, security, as well as enjoyment of a clean and healthy environment. Communities, thereby, experience a better overall quality of life.

Transit Agencies Approach to TOD and JD

TOD/JD programs require that transit agency guidelines set forth the parameters and processes of implementation. In a seminal article on transit joint development, the Urban Land Institute (1984) identified three generic approaches to implementation:

(1) The laissez-faire market approach, mainly involving the private sector taking the lead with an eye toward maximizing profits; BART's Walnut Creek station was cited as an example;

(2) a coordinated approach, involving the public sector establishing a comprehensive land use plan prior to station construction that orchestrates private and public sector activities; early joint development activities in Washington, D.C. and Atlanta were said to follow this approach; and

(3) project packaging, wherein the transit agency is more entrepreneurial, seeking to recapture value, temper land speculation, and become an active participant in land development; today, Washington's WMATA comes the closest to this proactive model (p. 18).

The document, *Forming Partnerships to Promote Transit-Oriented Development and Joint Development* (Reconnecting America, December 2009) noted that successful Joint Development and Transit Oriented Development programs reflect a few general principles that are important among transit agencies, local government, the private sector and citizens. These principles provide the framework for successful partnerships and include the following:

- Leadership
- Public involvement and a shared vision
- Communications and trust through shared work
- Written Assignments
- Implementation and commitment of staff resources (pp. 4-5).

Financial aspects of public-private partnerships may cover a revenue stream or commitments to construction or maintenance. Historically, a 1990 evaluation of 117 projects across the United States found cost-sharing to be the most common approached, followed by station development – either air rights or ground leases – and station concessions. {Sometimes benefits accrue from coordinating projects, such as improved pedestrian circulation or more functional use of open space (Cervero et al. 1991).} The primary aim of TOD and joint development are to boost ridership and also increase revenues. Community economic development and broader smart-growth agendas are secondary objectives.

OVERVIEW OF EXISTING CITY OF HOUSTON AND METRO POLICIES

A 2012 survey by the Kinder Institute for Urban Research has found growing support for more transit options to reduce and counter the effects of car dependency by residents in the Houston, TX area. Stephen Klineberg, the creator of the survey and co-director of the Institute, points out that 51 percent of respondents would choose a smaller home within walking distance of workplaces and shops, rather than a single-family home requiring a car for most trips (Kinder Institute for Urban Research, 2012). The nation-wide trend toward reducing car dependency has helped spur the development of programs and policies to support central city revitalization. Incorporating transit-oriented development (TOD) in downtown revitalization efforts ensures long-term viability and vitality of communities. However, TOD is not strictly limited to downtown areas; it can occur in any area of a region where dense, walkable communities near transit stations and stops are desired. In order to apply the results of literature and information learned from the selected city analysis, current TOD/JD policies for the City of Houston and Houston METRO are summarized below.

City of Houston Transit Corridor Ordinance

According to projections, the City of Houston is expected to grow by approximately 25% by 2040 reaching a population of 2,800,520 (Houston-Galveston Area Council). As with other large metropolitan areas throughout the U.S., increasing populations bring concerns of worsening traffic congestion and pollution issues and an overall negative effect on enjoyable and healthy living spaces. As a result, transit and other governmental agencies are taking progressive steps to transform urban landscapes into more pedestrian-friendly, livable communities by promoting transit-oriented development (TOD). In 2009, the City of Houston's Planning and Development Department passed the landmark Transit Corridor Development ordinance (Ordinance No. 2009-762) (Municode, 2009), which supports transit oriented development along METRO's light rail transit corridors. At a total of 30.2 miles, the corridor expansion includes the Main Street, Uptown, East End, North, Southeast and University lines. (The Transport Politic, 2009) The transit corridor ordinance offers property owners and developers the option to provide open spaces, attractive landscapes, and first floor building transparency. The ordinance encourages pedestrian and street level activity, along with the designed mixed use development. Mandatory requirements include a minimum 6 foot sidewalk. Property owners can choose an option (opt-in) performance standard that includes a 15 foot pedestrian realm with a 6 foot clear zone sidewalk. The ordinance also allows structures to be built closer to the street and changes requirements for driveway entrances, facilitating TOD compatible developments. Owners of property on streets that intersect a transit corridor and their property is within 1320 feet may opt-in to the ordinance provisions, as well (The City of Houston, 2009).

Houston Metro Joint Development Guidelines and Policies

METRO's joint development program is designed to enhance and increase ridership on the METRO system and meet land use, economic development and urban planning goals. The agency seeks to maximize revenues by pursuing the highest and best transit use of the specific site. Consistent with national TOD and joint development objectives, METRO desires its projects to provide pedestrian oriented development with an element of sense of place and

compatibility with the community. There is a commitment to quality urban design. For details of the policy see METRO (METRO, n.d).

TOD STRATEGIES OF SELECTED TRANSIT AGENCIES WITHIN THE UNITED STATES

The literature provided the starting point to structure an analysis of selected transit systems with well-known transit oriented and joint development initiatives. Based on the literature review, the research team explored elements such as policy changes, land negotiations or donations, conditions conducive for successful developments and other lessons learned that provided the basis for discussion with persons from 4 agencies known for active TOD/JD programs. The cities reviewed included Atlanta's MARTA, Washington, D. C.'s WMATA, New Jersey's NJ Transit, and Los Angeles County's Metro.

Each city has its own perspective on TOD. These cities were chosen because they are known to have progressive, proactive TODs characterized by relative success. Atlanta is considered to have similar density to Houston, Los Angeles was recommended by Steve Flippo of Houston to review TOD in a community known for auto dominance, and New Jersey has a transit-friendly communities pilot programs. WMATA shows examples of recently announced TOD's beginning decades after rail system completion. Components of the reviewed programs were identified for applicability to Houston.

Transit Agency Strategies

The 4 transit agency responses, experiences of other cities and information located in literature are explored according to several factors that play a role in successful implementation of TOD.

- The Role of Government and Transit Agencies
- Public-Private Partnership Strategies
- TOD Funding: Sources and Hurdles
- Gauging the Maturation and Success of TOD Locations

The Role of Government and Transit Agencies

The path to promoting TOD begins with the role of government and transit agency policy that facilitates development near transit nodes enabling greater proximity to work and other urban amenities. TOD also encompasses environmental issues that plague cities due to traffic congestion, particularly vehicle emissions that cause poor air quality and global warning concerns. Reducing Vehicle Miles Traveled (VMT) is seen as an added benefit yielded by the dense development of TODs. The existence of transit makes TOD and the benefits it provides, possible.

Programs and policies may be put into action to encourage TOD by regulating land use, setting reduced parking requirements, providing incentives that encourage TOD, or giving priority to joint development proposals. Local governments may implement zoning policies such as ordinances specifying land uses that promote TOD. In the City of Atlanta, planners have set up different ordinances to support transit orientated development. MARTA's Ted Tarantino states, "*For MARTA, these* (ordinances) *make the process easier when trying to establish new TOD's within the city. For other cities though, I have heard zoning has hindered development*". WMATA"s Steven Teitelbaum also feels regulations can be a hit or miss attempt at fostering

TOD. He says the issue is trying to get local governments and private lenders to understand that standard Euclidean zoning cannot be used for mixed development. There is a need for an understanding of TOD so the proper zoning scheme can be implemented.

According to the Los Angeles experience, regulation can have unintended consequences. Officials designed the California Environmental Quality Act (CEAQ) to improve the environment. In practice, the regulations resulted in suburban construction proceeding more easily than construction in the city, unintentionally facilitating sprawl where land was less expensive and projects less difficult to build. New Jersey noted the importance of properly wording regulations, recognizing market conditions and appropriate levels of guidelines, and designing rules that facilitate implementation without polarizing stakeholders.

Incentive-based zoning may be used to encourage mixed-income and mixed-use development. The City of Chicago provides a density bonus of additional floor area ratio and height in exchange for providing either money or on-site affordable housing (Reconnecting America, 2006) Transit agencies may also incentivize development by making parcels near transit stations available to developers or states may allow cities and counties to grant property tax abatements to developers of higher-density, mixed-use, affordable residential developments to help with the creation of affordable housing and TOD. Cities within the States of Oregon and Washington may grant these abatements. (Livable Places, n.d.) Other incentives include reducing minimum parking requirements or setting maximum parking requirements near major transit stops to lower construction costs of development (Livable Places, n.d.)

Public-Private Partnership Strategies

Public-private partnerships (PPP) are a necessary component of TOD and JD and offer financial and social gains for communities through shared development. Joint development is a form of a PPP in which development occurs on land owned by transit agencies. The transit agency benefits by gaining revenue from long term ground leases or proceeds from future sales of the construction on the land (Reconnecting America, 2006) According to MARTA, The Columbia at Sylvan Hills project in Atlanta was built on land MARTA sold to the City of Atlanta's economic development authority, Invest Atlanta. Invest Atlanta then sold it to Columbia Residential, developer of the apartments. "*This was a very successful public-private partnership allowing us to do the deal without requiring a typical Request For Proposal process and successfully speeding the usual amount of time needed to see these types of projects implemented,*" states MARTA's Tarantino.

Dr. Alexander Kalamaros, with Los Angeles County Metro, believes joint development programs result in more projects and stresses the importance of transit agency board of directors' and investing parties' understanding of the many aspects of real estate, such as what ground leases and other terms mean. Equally important is the understanding of joint development program policies and guidelines, party roles and responsibilities, and project objectives and procedures.

Washington, DC's WMATA Joint Development Program gives priority to partnerships that promote TOD and smart growth principles. The program goals include promoting TOD, attracting new riders to the transit system, providing mixed-use development, opportunities to

obtain goods and services near transit stations, and creating a source of revenue for WMATA to operate and maintain the transit system by negotiating joint development agreements between WMATA and public or private development entities. (WMATA, 2008). By working closely with local jurisdictions, transit agencies are able to implement joint development programs that spur economic development, enhance effectiveness of transit systems, and promote affordable housing.

In addition to partnerships between transit agencies and the private sector, PPPs may extend to partnerships between local governments and the private sector. Local government may acquire parcels and rezone them for TOD development; to address environmental issues, local governments may fund environmental remediation through EPA grants (Reconnecting America, 2006)

TOD Funding: Sources and Hurdles

There are many ways TOD may be funded. Federal agencies such as the Federal Transit Administration (FTA), the Federal Highway Administration (FHWA), and the U.S. Department of Housing and Urban Development (HUD) make funding available to promote TOD, but the distribution of funds vary. According to WMATA's Teitelbaum, "*Although TOD projects may meet FTA TOD requirements, it is up to the developers to secure federal funds and most funds are from private entities*". NJ Transit's Transit-Friendly Communities program received a grant from the FTA Transportation and Community and System Preservation Pilot Program (TCSP). The funds were used in a pilot study to investigate and document the steps involved in adapting a municipality's master plan and supporting zoning ordinances so as to encourage station-area development integrating the transit facility into its surroundings and fostering greater use of the facility (Smart Growth Gateway, 2012) It is important to note that the TCSP grant was not directly tied to a specific TOD project and none of the transit agencies contacted for this research are currently using federal funds to foster TOD.

In Los Angeles, a project at the Santa Fe Station was completely ready to proceed in 2007; the signed ground lease was finalized in 2008 and the developers sought HUD financing. In order to meet HUD eligibility requirements, a 20% affordable housing ratio was needed. With that commitment level met and HUD funding awarded, the project proceeded.

The City of Dallas received a Housing and Urban Development (HUD) Community Challenge grant in 2011 to enhance TOD through focused planning aimed at developing workforce, mixed income, and mixed-use housing at multiple Dallas Area Rapid Transit (DART) light rail stations. The funds will be used to assist in the transformation of these areas, leveraging existing planning efforts and significant rail investment to create safe, attractive community centers. (Planetizen, August 25, 2011)

Solely relying on the issuance of federal grants greatly limits capital resources and creates serious impediments to successful implementation. Local, regional, and state governments may ease the funding challenges TOD encounters by helping with hard to finance predevelopment costs, securing land for TOD, providing development capital from redevelopment funds and funding for public parking. Additionally, zoning incentives that include density bonuses can be used to fund affordable housing and infrastructure. Affordable housing is an importance piece of

TOD because it enhances community stability and sustainability. Housing Trust funds help preserve affordable housing near transit stations and city, county, and state jurisdictions may establish these funds via legislation or ordinance (EPA, 2009)

One of the hurdles is vehicle parking requirements that are contradictory to TOD wisdom. WMATA's Steven Teitelbaum, says one of the financial problems involves parking issues. "*Lenders (private) want more parking. This is both a zoning and a financing issue. TOD should not impose the same autocentric high levels of mandatory parking as standard single-purpose suburban zones because vehicle miles traveled (VMT) in TOD is reduced. People can walk or bike in denser environments and, of course, people can use transit in lieu of private cars. People who live in TODs have been shown to also own fewer cars, thus reducing parking demand. By reducing parking requirements TOD both creates a livelier environment and saves the developer substantial construction cost*." Kalamaros noted that lenders have a great deal of power over what occurs on development sites, including their demands about numbers of parking spaces.

Echoing the same opinion, MARTA's Tarantino states, "*The major issue in obtaining financing specifically for TOD projects that we have become aware of is the reluctance of financing institutions to go along with the reduced parking requirements we have advocated for our projects. Most lenders are looking at traditional parking ratios, such as one parking space per bedroom in apartment projects and anything less is a concern for them. Educating lenders on the rationale for the reduced need for parking that can come about with nearby transit stations is something we need to work on*".

New Jersey Transit's Vivian Baker suggests the current state of the economy is hindering TOD, but also offered educating commercial lenders about TOD and how this type of development can enhance their bottom line would help clear development hurdles.

Gauging the Maturation and Success of TOD

Gauging the maturation and success of TOD throughout the U.S. varies. Agencies may set different performance measures according to the needs of their community and local economy. Those measures may be met at different times. Completed in 2002, today the Lindbergh City Center station is considered MARTA's model of TOD success. Located in one of Atlanta's newest retail and residential districts, the Lindbergh City Center features mixed-use development made possible through MARTA public-private partnerships. Its success can be measured by 4 factors (Myers, 2004):

1. Regional Vision
2. Location Efficiency
3. Financing
4. Market

The regional vision involved the collaborative efforts of the community as whole. The desired TOD outcome is understood as well as the roles and responsibilities of those participating in the implementation process. For example, the Lindbergh City Center station in Atlanta is conducive to increasing transit ridership, mixing uses, and neighborhood walkability. Initial financing for the Lindbergh station was achieved when MARTA published a request for proposal and attracted

a developer. The station's ideal location eventually spurred additional development proposals. The Lindbergh station was designated as a mixed use station and Atlanta's public officials correctly determined it was in an area with a market to support TOD and promote economic development.

However, even if a market for passengers exists, year to year increased ridership alone does not guarantee a successful TOD. As evidenced by the failure of LA Metro's Blue Line to serve as a catalyst for economic development in the immediate vicinity of its corridor stations. This 22 year old, 22 mile line ranks second in ridership among Metro's six lines and is estimated to board 26.9 million passengers during the 2012 fiscal year (Metro) Despite those numbers, the line is not seen as a TOD success. The reasons are believed to be the following; inadequate planning for necessities such as park-and-ride facilities, poor coordination between responsible agencies, failure to tap into adequate resources of funding from federal agencies, failure to rezone areas along corridor from industrial districts to more compatible land uses, and the high land costs that frustrated efforts to build affordable housing in areas where the demographic consisted of poor minorities (Loukaitou-Siders, 1999).

As mentioned at the beginning of this section, the TOD maturation varies among agencies. According to WMATA's Teitelbaum, many stations in the DC area are considered very successful TODs, but flourished at different times after implementation.
He states; "*The stations in downtown Washington, D.C. saw TOD development almost immediately. The same is true of suburban Bethesda, Maryland, which saw TOD almost as soon as the station opened. Some of the other suburban stations – chiefly Rosslyn, Courthouse, Clarendon, Virginia Square and Ballston in Arlington County, Virginia (the famous "Rosslyn-Ballston Corridor") – took a bit longer for TOD to flourish and are still growing but are already one of the nation's premier examples of TOD. Other stations in the inner core in Washington, D.C. (particularly along the Green Line) or in the inner suburbs (Silver Spring, Maryland and King Street in Alexandria, Virginia for example) have filled in more slowly but are also notable success stories, often taking a decade or more to blossom after service began. Others, like White Flint and Twinbrook in Montgomery County, Maryland, are now in the throes of massive TOD development; 15-20 years after service began*."

Neighborhood demographics change from one transit station to the next, so it is necessary for transit agency strategies to understand the current and projected demographics surrounding stations and prepare to meet their corresponding needs and desired amenities. Does the area consist of educated professionals who shop for high end products and belong to health clubs? Or does the area consist of primarily less educated, low income residents who are in need of affordable housing and shop at discount retailers? The functionality of TOD must be suitable to the areas demographic/market conditions and needs as well as achieve social equity goals. This includes creating connected communities integrated with the convenient availability of goods, services, and urban amenities. Again variation applies. Different types of development foster TOD success at different locations.

MARTA's Tarantino confirms implementing residential mixed used development at the Lindbergh City Center has been very successful. "*In my opinion, residential mixed used development is probably the most successful. …there is a residential mixed use property that has*

about 200 living units. Before the doors were opened, 60 percent of the property was leased out", Tarantino further states, "*People…. are pushing to live within the city center*". In New Jersey, mixed use that includes retail and commercial has also been successful. NJ Transit's Vivian Baker makes an interesting point, "*People who live and work in same building are growing by leaps and bounds*". Los Angeles's Kalamaros indicates residential uses work best, even when commercial is not present in the land use mix. He offers caution about the thinking that commercial or business uses will always work, suggesting attention to the person volume needed to support commercial development. A potential solution is to give commercial tenants discounts on the rent or allow them to pay a percentage of their gross sales as rent.

WMATA encourages the use of office space at its TOD locations because of its contributions to ridership and contribution to revenue generation. According to Teitelbaum, *"Multi-family housing has been very successful recently here as elsewhere around the country, and is now often the "highest and best use" in TOD. However, residential development has not generated as much ridership, contrary to some expectations, although the ridership it does generate is often spread into non-peak periods, which is a benefit to the transit system."* In consideration of retail, stakeholders will want to consider that it is difficult to carry dry goods or groceries on trains and buses. Clearly, the uniqueness of communities must be a variable in analyzing the potential for TOD success. What works for one city, will not necessarily work for another. Yet, it is this diversity of urban living environments made possible through TOD that serve as the lifeblood of thriving communities.

FOCUS ON SELECTED STATION TODS/JDS

Select stations in the cities identified for evaluation show their unique characteristics and reflect the strengths of their proximate TODs. Table 1 names each station and community and is followed by descriptions of each.

Table 1. Communities Chosen for Evaluation

Location of TOD Community	TOD Community
1. Washington, D.C (WMATA)	*Rosslyn Station*
2. Atlanta, Georgia (MARTA)	*Lindbergh Station*
3. Burlington, New Jersey (NJ Transit)	*Burlington Town Center Station*
4. Los Angeles, California (LA Metro)	*Hollywood/Vine Station*

Rosslyn Station, Arlington County, VA (WMATA)

Washington D.C, home to the US federal government, attracts a diverse mix of government workers, members of Congress from every state, foreign emissaries, lobbyists and tourists. (Washington D.C., 2012) Washington D.C. is known for its increasing development of regional Transit Oriented Development (TODs) including locations in Virginia, and Maryland. The transit agency, WMATA, focuses on promoting smart development around transit facilities, increasing capacity to service growth in Metrorail and Metrobus with project expansions that best reflect WMATA's vision and goals. The Metrorail and Metrobus system serves a population of 3.5 million within a 1,500 square-mile area. (WMATA, 2012) One of WMATAs successful TOD stations is the Rosslyn Station.

Rosslyn is Virginia's most urban up-and-coming "city." The city's urban design committee, the Rosslyn Renaissance, strives to create an environment that has the *live, play* and *work* characteristics. Since 1992, the committee has worked with the County staff, residents, and developers to refine new projects. The Rosslyn Metro station area is in a corridor that also services 4 other stations as observed in Figure 2. This path of stations is also known the Rosslyn-Ballston (R-B) Metro Corridor. Table 2 provides a summary of characteristics for the City of Rosslyn (Rosslyn, Virginia, retrieved August 22, 2012).

Table 2. City of Rosslyn Demographics Data

RESIDENTS	• Approximately 10,800 people live in Rosslyn • Average age is 38 • 74% are college graduates • Of those college grads, 43% have advanced degrees • Average household income is $100,168 • Most Rosslyn residents live in one- and two-person households
WORKERS	• Nearly 40,000 people work in Rosslyn • More than 8.5 million square feet of office space • An additional1.2 million square feet of office space under development

Source: Rosslyn Economic Information http://www.rosslynva.org/build/economic-information

Rosslyn has a high intensity of residential, hotel and office spaces, with developers encouraged to optimize Rosslyn's physical style and economic opportunities through architectural quality and mixed-use urban design. The majority of the land use within 1600 feet of the station is planned for a certain amount of medium to high residential uses and mixed-use offices, apartments, and hotels. Rosslyn is the busiest Metro station in Virginia with more than 180,000 weekly travelers passing through the station.

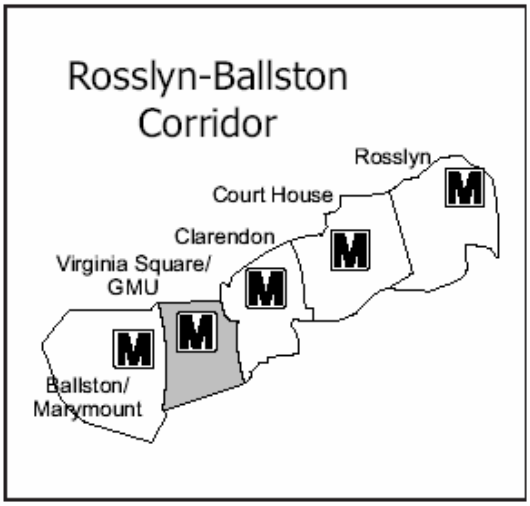

Figure 2. Rosslyn-Ballston Corridors (Source: Arlington County Department of Community Planning Housing and Development, Planning Division 5-06).

In order to ensure future ridership for the R-B Metro system, the Arlington County Department of Community Planning Housing and Development strived for mixed-used development with a significant level of residential uses with an emphasis on preserving existing single family, garden apartments and green open spaces. By incorporating TOD principles, the County focused on redevelopment within ¼ mile of metro station entrances through the adoption of a corridor-wide

General Land Use Plan (GLUP) based on agreed-to development goals. With these goals set, through proper planning and execution of site plans that specified approved uses and design, the county was able to successfully achieve its vision. The result for the Rosslyn station was a 134% increase in metro ridership from 13,637 in 1991 to 31,933 in 2005. (Arlington County Department of Community Planning, Housing and Development, Planning Division, 2006). Figure's 3 and 4 are photos of the entrances to the Rosslyn Station.

Figure 3. Rosslyn Metro Entrance
Source: dcist.com

Figure 4. Rosslyn Metro Station
Source: Arlnow.com

The Rossalyn-Ballston (R-B) Metro Corridor, as seen in Figure's 5 and 6, is a clear indication of the changing landscape and progress made as a result of TOD.

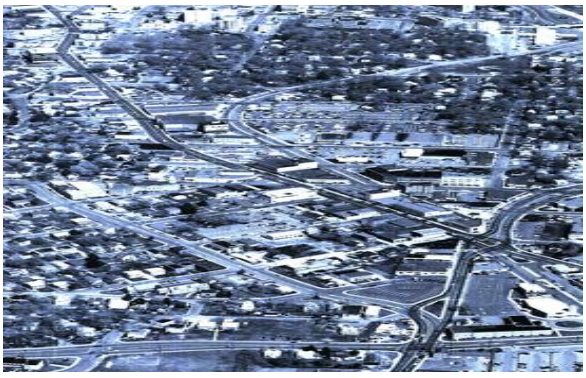

Figure 5. R-B Corridor 1970

Figure 6. R-B Corridor, Over 30 years Later

Source: Arlington County Department of Community Planning Housing and Development, Planning Division 5-06.

Lindbergh Station, Atlanta, Georgia (MARTA)

"Atlanta, the capital of Georgia, is known worldwide as a transportation hub. In 2010, the city official population was about 420,000 (Table 3), while the Atlanta Regional Commission 10-county enumerated population was 4.1 million. (Atlanta Regional Commission, 2010)

Table 3. City of Atlanta Demographic Data

RESIDENTS	• Estimated population of 420,003 • Median resident age is 32.9 • Population 25 years or older: 34.6% are college graduates, 13.8% have advanced degrees, 14.0% are unemployed • Median household income is $49,981 • Average household size is 2.1 people
WORKERS	• The most common industries: Educational Services (20.6%) and Professional, scientific, and technical services (18.3%) • The most common occupations: Other management occupations except farmers and farm managers (5.9%) and Other sales and related workers including supervisors (4.8%) • Daytime population change due to commuting: +62.4% • Workers who live and work in Atlanta: 59.3% • Mean travel time to work (25 years and over - commute): 28.3 minutes • Travel time to work in less than 30 minutes: By public transportation (23.5%), Other means (69.7%)

Source: City Data

Atlanta's Buckhead area is affluent and elegant. Georgia's Metropolitan Atlanta Rapid Transit Authority (MARTA) was created in 1965, when the MARTA Act was passed by the state legislature and subsequently approved in four counties and the City of Atlanta. In June of 1979, MARTA's first train, the East Line, began operating between Avondale and Georgia State Station. By June of 1996, MARTA had completed more than 20 major projects, including the new seven-mile North Line that included the Buckhead, Medical Center, and Dunwoody Stations. Later, the Atlanta Business Chronicle would name the Lindbergh TOD project the "Best Mixed-Use (Real Estate) Deal of the Year." (MARTA, 2009) Lindbergh (Buckhead) Center Station is one of MARTA's most successful transit oriented development locations as suggested by a MARTA representative (Ted Tarantino personal communication August 7, 2012). Public and private sector interests worked jointly to foster this development (Figures 7-9).

Figure 7. Aerial view buildings of Buckhead district of Atlanta, Georgia
(Source: Bill Cobb, October 9, 2006)

The Lindbergh Center complex began as an old industrial area that was rezoned for mixed and higher-density development; it is located along the North rail line north of the downtown business district. The Lindbergh TOD was designed to increase transit patronage while implementing a transit friendly environment that encourages people to live, work, and play in places conveniently accessed by transit. The Lindbergh Center transit station is built on a 47 acre of land and has 2.7 million square feet of office space, 330,000 square feet of retail space, 566 apartments, 388 condominiums, and a 190-room hotel (Shearin, 2001). It provides access to MARTA's headquarters (Figure 10).

Figure 8. Lindbergh Center Transit Station **Figure 9. Lindbergh Center Terminal Entrance**

Sources: The Architecture Group, Inc ; Flicker, http://www.flickr.com/photos/49394874@N08/6790474282/

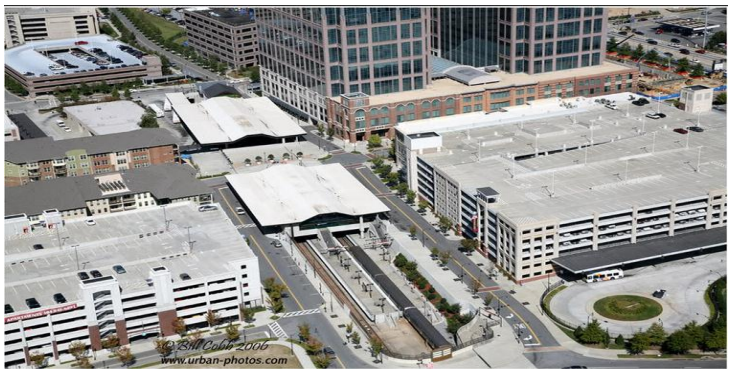

Figure 10. Lindbergh Center Marta (Buckhead)
Source: City-Data.com

New Jersey Transit's Burlington Town Center Station, Burlington, NJ
The City of Burlington became incorporated by the State of New Jersey in 1784. It has the distinction of being the first and original township in Burlington County, the first recorded European settlement in New Jersey, and having served as the transportation hub for the world's first steam powered boat. (City of Burlington New Jersey, n.d.). Today, Burlington has an estimated population of 9,920. (see Table 4).

Table 4. City of Burlington Demographics Data

RESIDENTS	• Estimated population of 9,920 • Median resident age is 38.9 • Population 25 years or older: 12.1% are college graduates, 3.7% have advanced degrees, and 5.6% are unemployed • Median household income is $48,084 • 52% live in 2-3 person households and 27% live in 4-5 person households
WORKERS	•The most common industries are Public Administration (9.7%) and Healthcare •The most common occupations are Retail sales workers (except cashiers), (7.4%) and Building and grounds cleaning and maintenance (4.3%) • Daytime population change due to commuting: +5.3% • Workers who live and work in Burlington: 17.3% • Mean travel time to work (commute): 23.5 minutes • Travel time to work in less than 30 minutes: By public transportation (51.4%), Other means (70.6%)

Source: City Data

The New Jersey Transit Corporation (NJ Transit) was founded in 1979. With a service area of 5,325 square miles, it is the nation's largest statewide public transportation system providing bus, rail and light rail transit (NJ Transit, 2012). The light rail transit system is made up of three lines carrying about 35,800 passengers on a typical weekday. (NJ Transit) The three light rail lines include the Hudson-Bergen Light Rail (HBLR), the Newark Light Rail (NCS), and the River LINE Light Rail Now (seen in Figure 11).

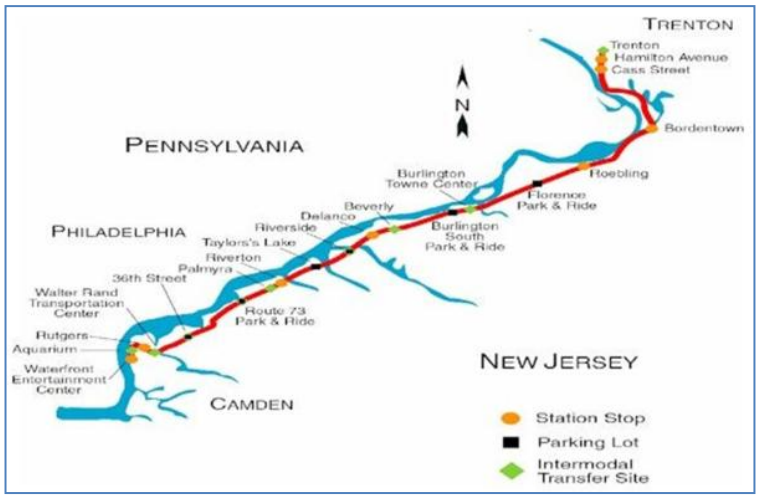

Figure 11. NJ Transit River Line.
Source: (NJ Transit, 2012)

The River Line opened in 2004 and is the only line powered by diesel fuel. Connecting Camden to Trenton, this 56.7 (directional route) mile corridor averages 8,762 weekday passengers, serves 12 municipalities, and has 20 stations stops (NJ Transit) In March 2007, Burlington City was designated as a transit village by the New Jersey Department of Transportation (NJ DOT). Recognition as a transit village allowed the station to receive a $100,000 grant to create an economic hub around the Burlington Town Center station. The city also received a $90,000 grant from the Delaware Valley Regional Planning Commission's (DVRPC) Transportation and Community Development Initiative (TCDI) to amend documents to encourage development (Delaware Valley Regional Planning Commission, 2007).

By forming partnerships with Burlington County, NJ DOT, NJ Transit, private entities and businesses, Burlington City successfully redeveloped vacant and underutilized parcels near the station into commercial and multi-family residential uses. Other notable redevelopments near the station include townhomes on Washington Avenue, Waterworks, and TathamMews, and the Metropolitan Inn (seen in Figure 12). (DVRPC, 2007). The Metropolitan Inn, renovated for nearly $9,000,000, created 52 senior housing apartment units for age and income restricted citizens. Conveniently located one block from the Burlington Town Center station, a post office, and shopping, this development contains mixed-use office, as well as retail space. (City of Burlington New Jersey, 2008)

Figure 12. The Metropolitan Inn.
Source: DVRPC

Hollywood/Vine Station Los Angeles, California

Los Angeles is the second largest US city with a population of approximately 3.8 million (Table 5). Los Angeles County Metropolitan Transit Authority (LACMTA or MTA), preceded by the Southern California Rapid Transit District, was established on April 1, 1993 and provides bus and rail services throughout Los Angeles County.

Table 5. City of Los Angeles Demographics Data

RESIDENTS	• Estimated population of 3,792,621 • Median resident age is 34.1 • Population 25 years or older: 25.5% are college graduates, 9.1% have advanced degrees, 9.3% are unemployed • Median household income is $48,617 • Average household size is 2.8 people
WORKERS	• The most common industries: Educational Services (19%) and Professional, scientific, and technical services (13.4%) • The most common occupations: Building and grounds cleaning and maintenance (6.3%) and Other management occupations except farmers and farm managers (4.7%) • Daytime population change due to commuting: +3.5% • Workers who live and work in Los Angeles: 63.1% • Mean travel time to work (25 years and over - commute): 29.6 minutes • Travel time to work in less than 30 minutes: By public transportation (23%), Other means (58.2%)

Source: City Data

The City of Los Angeles adopted a TOD framework which includes policies encouraging development around transit corridors and within a ¼ mile of stations. The County of Los Angeles Codes requires pedestrian-friendly environments for all new development in Traffic Oriented Districts (California Department of Transportation). LACMTA has about 170 bus routes; 24 are contracted to private transit operators that divert into 5 service sectors -- San Fernando Valley, Westside/Central, San Gabriel Valley, South Bay and Gateway Cities. LACMTA currently operates 4 Rail Lines (Blue, Red, Green, and Gold) providing service to Hollywood, Korean Town, LA airport, Norwalk and Pasadena (Figure 13). (LACMTA, 2000). As of July, 2012, MTA has a total bus and rail ridership of approximately 1.4 million average weekday boardings. Of that number, 351,553 utilize the rail system. (Metro, 2012)

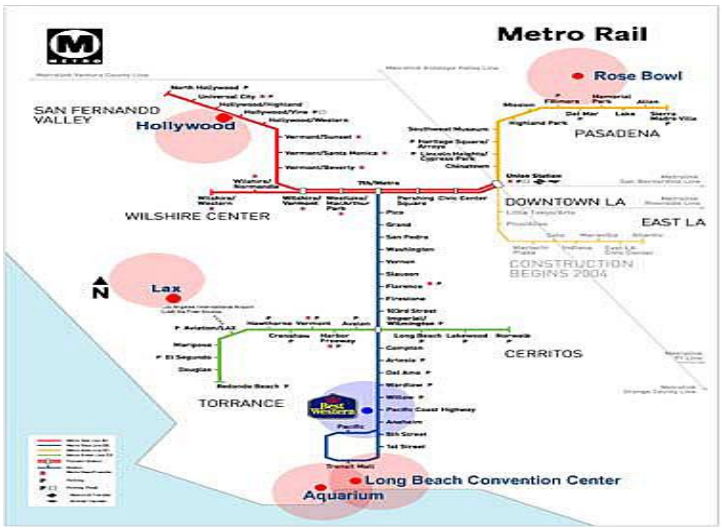

Figure 13. Metro Rail System
Source: inlosangelescalif.net

Since construction of the Red Line, Los Angeles has claimed 11 successful developments with signature projects along the Red, Purple, and Gold lines. The Los Angeles Hollywood/Vine Metro Station operates on the Red Line with development occurring across approximately 20 years from conception (Kalamaros personal communication August 16, 2012). The Hollywood & Vine Red Line station is part of Metro's Joint Development program that encourages TOD (Sussman/Prejza & Company, Inc.). TODs built at the station include the Hollywood & Vine apartments, which was completed in 2009. It features 375 apartments and 28,000 square feet of ground floor retail. The Hollywood & Vine W Hotel & Condos, partially owned by Metro, features a 300 room W Hotel, 143 condominiums, 30,000 square feet of ground floor retail, a redesigned plaza and a subway entrance (see Figure 14). (Epstein, Joe, 2012).

Figure 14. Hollywood/Vine Metro Station Entrance
Source: Sussman/Prejza & Company, Inc.

SUMMARY OF FINDINGS

The strategies used by agencies to encourage TOD range from formulating policies that incentivize development to forming partnerships with private entities that generate revenues that may be used to fund future projects. Agencies should learn lessons from both the successes and failures of previous TOD projects. Knowledge of where funding resources are and their requirements will help mitigate the limitations to development generally presented by TOD funding issues. This includes tapping into federal, state, regional, local and private funding opportunities. Lack of familiarity also curtails negotiation efforts with lending institutions. By helping lenders gain a better understanding of TOD and how they will be compensated, developers can better position themselves for financing they need for projects. Additionally, educating lenders about the restraints to development caused by parking requirements will benefit the TOD process as well.

The maturation and success of TODs vary throughout the nation based on the needs, local economies, and local policies of communities. In some cases TODs flourished immediately, while in other areas TOD filled in more slowly, some up to 15-20 years after service began. Nevertheless, they are still considered success stories. Just as there are varying maturation times for TODs, there are varying types of land use options that work best for different communities. Some areas thrive with residential mixed use development, while others do better with office space.

It can be ascertained from this research that the recurring theme of successful strategies involves education. This includes educating all investing parties about their roles in the TOD process, the benefits and hurdles, resources available, policies and guidelines, and lessons from past projects. The education process should include the transit agency's board of directors, who play a role in the priority TOD is given within the agency. Due diligence in gaining as much information as possible will significantly increase the chances of TOD success. When TODs are successfully implemented, community benefits include economic opportunities, social equity, environmental quality, improved health and safety, and connectedness to the goods, services, and amenities. The existence of transit makes it possible for communities to grow and experience revival through TOD development.

Recommendations for the City of Houston and Houston METRO

Transferable lessons that can be considered by METRO fall into the areas of policy, public – private partnership (PPP) strategies and mechanisms for financing projects. Public policies encourage TOD by designating land use mixes, setting reduced parking requirements, providing incentives that encourage TOD, or giving priority to joint development proposals. The City of Houston's Transit Corridor Ordinance does not designate specific uses, but provides an opportunity for developers to pursue projects more conducive to pedestrians and transit users. The case study transit agencies reflected a number of public – private partnerships that were successful, but are difficult to replicate entirely due to each property's and agency's individual characteristics. Collecting examples of PPPs for ready consideration can be done. The Atlanta example where property was sold to the city's economic development unit, then sold to a residential developer is an example for consideration.

The research shows a robust set of examples to draw experiences and knowledge for implementing TOD. An opportunity exists for METRO to work with the City of Houston to more assertively facilitate the information to developers about the Transit Corridor Ordinance. Sponsoring periodic workshops similar to the Los Angeles annual event would offer the opportunity for property owners to be aware of their design options early. Perhaps the outgrowth could be more projects utilizing the provisions available in the Transit Corridor Ordinance, resulting in more transit oriented development.

By prominently displaying a link to the City's Transit Corridor Ordinance at their website, METRO would provide valuable information that will incentivize and promote economic development.

REFERENCES

AASHTO, American Association of State Highway and Transportation Officials. (April 2006). **The Role of State DOTs in Support of Transit-Oriented Development (TOD)**. Retrieved July 24, 2012 from http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25%2820%29_FR.pdf

Arlington County Department of Community Planning, Housing and Development, Planning Division (May 2006). **30 Years of Smart Growth: Arlington County's Experience with Transit Oriented Development in the Rosslyn-Ballston Metro Corridor**. Retrieved August 23, 2012 from http://www.fairfaxcounty.gov/planning/tod_docs/070606_30yrssmartgrowth.pdf

Atlanta Regional Commission. (2010). **Cities & Towns 2010 Yearbook of Growth and Change**. Retrieved September 23, 2012 from http://documents.atlantaregional.com/infocenter/Cities_And_Towns_Report_2010.pdf

Business Dictionary Retrieved August 7, 2012 from http://www.businessdictionary.com/definition/accessibility.html

California Department of Transportation. **GLOSSARY.** Retrieved August 6, 2012 from http://transitorienteddevelopment.dot.ca.gov/miscellaneous/NewWhatisTOD.htm

California Department of Transportation. (n.d.) Transit-Oriented Development (TOD) Database. **Encourage Development In Transit Corridors (Policies)** Retrieved August 6, 2012 from http://transitorienteddevelopment.dot.ca.gov/process/stateViewProcessStation.jsp?processId=22&&stationId=7

Cervero, R., Hall, P. and Landis, J. (1991). **Transit Joint Development in the United States**. Berkeley, California: Institute of Urban and Regional Development, National Transit Access Center, University of California, Monograph 42.

Cervero R., Ferrell C., and Murphy S. (October 2002). **Transit-Oriented Development and Joint Development in the United States: A Literature Review**. TCRP, Transit Cooperative Research Program Research Results Digest. Number 52 Retrieved from http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rrd_52.pdf

Cervero, R., Steven, M., Christopher, F., Natasha, G., Yu-Hsin, T., Arrington, G.B. (2004). **Transit Oriented Development in the United States: Experience, Challenges, and Prospects**. TCRP, Transit Cooperative Research Program Report 102 Retrieved http://www.urbanunlimited.nl/uu/downloads.nsf/10/401141a67706cf4dc12570c000389ea6/$file/reader+transit+c.pdf

City Data. (2012) **Atlanta, Georgia**. Retrieved September 17, 2012 from http://www.city-data.com/city/Atlanta-Georgia.html

City Data**.** (2012). **Burlington, New Jersey**. Retrieved September 4, 2012 from http://www.city-data.com/city/Burlington-New-Jersey.html

City Data. (2012). **Los Angeles, California**. Retrieved September 17, 2012 from http://www.city-data.com/city/Los-Angeles-California.html

City of Burlington New Jersey USA. (2008) **Archive Of Commemorative Pages, Offices, Authorities, Boars & Agencies CoBRA, City of Burlington Redevelopment Agency**. Retrieved September 3, 2012 from http://www.burlingtonnj.us/Archive/ArchiveCoBRA.html

City of Burlington New Jersey USA. (n.d.) **City History Political History Brief Background**. Retrieved September 3, 2012 from http://www.burlingtonnj.us/History.html

Delaware Valley Regional Planning Commission. (2007). **On Track Progress Towards Transit-Oriented Development In The Delaware Valley, 2007**. (Retrieved September 3, 2012) http://www.dvrpc.org/reports/07030.pdf

EPA, Environmental Protection Agency. **Encouraging Transit Oriented Development, Case Studies that Work** (2009). Retrieved September 2, 2012 from http://www.epa.gov/dced/pdf/phoenix-sgia-case-studies.pdf

Epstein, J. (May 24, 2012) **Los Angeles and the Case for Transit Oriented Development: TOD Since the Red Line**. Retrieved August 31, 2012 from http://la.streetsblog.org/2012/05/24/los-angeles-and-the-case-for-transit-oriented-development-tod-since-the-red-line/

Evans, J. E., Pratt, R. H., Stryker, A. and Kuzmyak, J. R. (2007). **Transit Oriented Development Traveler Response to Transportation System Changes**. TCRP, Transit Cooperative Research Program Report 95. Retrieved from http://www.fta.dot.gov/documents/Transit_Oriented_Development_-_Traveler_Response_to_Transportation_System_Changes_TCRP_Report_95.pdf

Houston-Galveston Area Council. **Community and Environmental Employment and Population Forecast Data, 2012**. Retrieved August 6, 2012 from http://www.h-gac.com/community/socioeconomic/forecasts/archive/2035.aspx

Kinder Institute for Urban Research. **The Kinder Houston Area Survey-2012: Perspectives of a City in Transition.** Retrieved August 30, 2012 from http://kinder.rice.edu/uploadedFiles/Center_for_the_Study_of_Houston/Rice%20HAS%20Report%202012%20single%20pages.pdf

Konvitz, J.W. (1987). **Patterns in the Development of Urban Infrastructure**. In American Urbanism, ed. Howard Gillette Jr. and Zane L. Miller, 204. Westport, Conn: Greenwood Press.

Landis, J., Cervero, R., and Hall, P. (1991). **Transit Joint Development in the USA: An Inventory and Policy Assessment.** EconPapers: Environment and Planning C, Vol. 9, No. 4, pp. 431-452. Retrieved August 15, 2012 from http://econpapers.repec.org/article/pioenvirc/default10.htm

Livable Communities Coalition. Retrieved August 6, 2012 from http://www.livablecommunitiescoalition.org/

Livable Places. **Encouraging Transit Villages**. Retrieved August 30, 2012 from http://www.livableplaces.org/policy/todincentives.html

Los Angeles County Metropolitan Transit Authority. (2000). Retrieved August 31, 2012 from http://www.chaffeeyiu.com/labus/lacmta.htm

Loukaitou-Siders, A. and Banerjee, J. (1999) University of California Transportation Center. **The Blue Line Blues: Why The Vision Of Transit Village May Not Materialize Despite Impressive Growth In Transit Ridership**. Retrieved September 2, 2012 from http://www.uctc.net/papers/425.pdf.

Lund, H. M. (2006). **Reasons for Living in a Transit-Oriented Development, and Associated Transit Use."** Journal of the American Planning Association Volume72 (3): 357-365.

MARTA, Metropolitan Atlanta Rapid Transit Authority. (2009). About MARTA. **A brief history of the Metropolitan Atlanta Rapid Transit Authority**. Retrieved September 23, 2012 http://www.itsmarta.com/marta-past-and-future.aspx

METRO. (n.d.) Joint Development Guidelines, Policies and Procedures. Retrieved August 15, 2012 from http://www.ridemetro.org/Opportunities/RealEstate/Pdfs/JointDevelopmentGuidelines.pdf

Metro. (August 21, 2012). **Facts at a Glance.** Retrieved September 2, 2012 from http://www.metro.net/news/facts-glance/#P110_1342

Moses, Sharon, Lewis, Lastrappe (June 2009). Moving Toward Implementation: An Examination of the Organization and Political Structures of Transit Oriented Development. Southwest Region University Transportation Center. Report No. 473700-00050.

Myers, J. (2004). **Urban Enthusiast Top Four Requirements of a Successful Transit Oriented Development, Atlanta's Lindbergh Station – A Case in Point.** Retrieved September 2, 2012 from http://www.urbanenthusiast.com/Research/TOD_Top4/TOD_Top4_Requirements.pdf.

Mineta Transportation Institute. (n.d.). **HISTORY OF TRANSIT-ORIENTED DEVELOPMENT.** Retrieved August 13, 2012 from http://www.transweb.sjsu.edu/mtiportal/research/publications/documents/envisioning2/mti2001_etodp_website/TOD_History.PDF

Municode. (2009). ARTICLE IV. **TRANSIT CORRIDOR DEVELOPMENT.** Retrieved on August 1, 2012 from http://library.municode.com/index.aspx?clientId=10123&stateId=43&stateName=Texas

NJ Transit. (2012). **About Us**. Retrieved August 28, 2012 from http://www.njtransit.com/tm/tm_servlet.srv?hdnPageAction=CorpInfoTo

NJ Transit. **Facts At A Glance, 2012**. http://www.njtransit.com/pdf/FactsAtaGlance.pdf (accessed August 28, 2012)

NJ Transit. (2012). **NJ Transit Makes The Grade In Latest Customer Survey, 2012**. Retrieved August 28, 2012 from http://www.njtransit.com/tm/tm_servlet.srv?hdnPageAction=PressReleaseTo&PRESS_RELEASE_ID=2784

New Urbanism. Retrieved August 6, 2012 from http://www.newurbanism.org/

Partners for Livable Communities. Retrieved August 7, 2012 from http://www.livable.org/about-us/what-is-livability

Planetizen. (August 25, 2011). **Deadline Extended RFP - HUD TOD Redevelopment Planning Grant, Dallas, Texas**. Retrieved September 1, 2012 from http://www.planetizen.com/node/50791

Reconnecting America. (December 31, 2009). **Forming Partnerships to Promote Transit Oriented Development and Joint Development**. Retrieved July 30, 2012 from http://www.reconnectingamerica.org/assets/Uploads/APTA-SUDS-UD-RP-002-09jointdevelopment.pdf

Reconnecting America. (2006). **Tools for Mixed-Income TOD** Retrieved. August 30, 2012 from http://www.reconnectingamerica.org/assets/Uploads/tools.pdf 06

Rosslyn, Virginia. **Rosslyn Urban Development**. Retrieved August 22, 2012 from http://www.rosslynva.org/

Shearin, R. (2001).Southeast Real Estate Businesses. **Lindbergh Center Mixes Uses by Mixing Developers.** Retrieved from http://www.southeastrebusiness.com/articles/JAN01/cover1.html

Smart Growth Gateway. (2012). **Get Help: Make a Transit-Friendly Development in Your Town**. Retrieved September 1, 2012 from http://www.smartgrowthgateway.org/transit_help.shtml

Sedway Cooke. (July 1984). **Joint Development.** Urban Land Institute, pp. 16-20.

Sussman/ Prejza & Company, Inc. Retrieved August 31, 2012 from http://www.sussmanprejza.com/portfolio/project/metro-hollywoodvine-red-line-station

The City of Houston. Planning and Development. (2009). **Proposed Transit Corridor Ordinance, 2009.** Retrieved July 31, 2012 from http://www.houstontx.gov/planning/_urban/PC_presentation.pdf

The City of San Diego. **Affordable Housing Information**. Retrieved August 6, 2012 from http://www.sandiego.gov/housing/whatis.shtml

The Transport Politic. (2009). **Houston Readies Four Light Rail Lines by 2012**. Retrieved August 5, 2012 from http://www.thetransportpolitic.com/category/places/houston/

Transit Oriented Development. TDM Encyclopedia Victoria Transportation Policy Institute. (n.d.). **Using Public Transit to Create More Accessible and Livable Neighborhoods**. Retrieved August 5, 2012 from http://www.vtpi.org/tdm/tdm45.htm

Washington D.C. (2012). **About Washington D.C.** Retrieved August 20, 2012 from http://washington.org/about-washington-dc

WMATA. (2008). **WMATA Joint Development Policies and Guidelines.** Retrieved August 31, 2012 from http://www.wmata.com/pdfs/business/Guidelines%20Revision11-20-08.pdf

WMATA. (2012). **About Metro. Metro Facts.** Retrieved August 31, 2012 from http://www.wmata.com/about_metro/docs/metrofacts.pdf

Appendix 1. TRANSIT ORIENTED DEVELOPMENT TERMS

There are several terms associated with Transit Oriented Development that are shown below. The list is compiled from a variety of sources shown in parenthesis at the end of the definition.

Accessibility: Ease with which a facility or location can be reached from other locations.

Affordable Housing: The U.S. Department of Housing and Urban Development (HUD) defines "affordable" as housing that costs no more than 30 percent of a household's monthly income. That means rent and utilities in an apartment or the monthly mortgage payment and housing expenses for a homeowner should be less than 30 percent of a household's monthly income to be considered affordable. (City of San Diego)

Connectivity: Interconnected street grid network disperses traffic & eases walking; a hierarchy of narrow streets, boulevards, and alleys; high quality pedestrian network and public realm makes walking pleasurable (NewUrbanism.org)

Density: A common measure of people per mile, households per acre, jobs per block, or combinations of these and other factors. (CA.gov)

Livability: Livability is the sum of the factors that add up to a community's quality of life including the built and natural environments, economic prosperity, social stability and equity, educational opportunity, and cultural, entertainment and recreation possibilities. (livable.org)

Mixed-Land Use or Mixed-Use Development: Mixed-use development, sometimes referred to as live/work/play communities, refers to development that includes a mixture of complementary land uses. The most common mix of land uses include housing, retail, office, commercial services, and civic uses. (Livable Communities Coalition)

Neighborhood TOD: A TOD with an emphasis on residential use with locally oriented shopping in facilities that are primarily focused on serving the needs of the neighborhoods population**.** (CA.gov)

New Urbanism: New Urbanism is the movement in favor of the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy.

Pedestrian-Friendly: Many features that work together to make a livable and walkable environment or community**.** This concept involves increasing awareness about the fun and health of walking, being able to park once to shop and do errands throughout town, and promoting the regulations and tools to make the streetscape and built environment support walkability.

Smart Growth: Smart Growth, or quality growth, refers to developing urban (metropolitan) communities that are more hospitable, productive, and fiscally and environmentally responsible than most communities developed in the last century. (Livable Communities Coalition)

Sustainability: Minimal environmental impact of development and its operations; eco-friendly technologies, respect for ecology and value of natural systems; energy efficiency; less use of finite fuels; more local production; more walking, less driving. (newurbansim.org)

Transit Oriented Development (TOD): Transit Oriented Development also known as Transit Oriented Design it is the creation of compact, walkable communities centered around high quality train systems. This makes it possible to live a higher quality life without complete dependence on a car for mobility. (Livablecommunitiescoalition.org)

Walkability: Most things within a 10-minute walk of home and work, pedestrian friendly street design (buildings close to street; porches, windows & doors; tree-lined streets; on street parking; hidden parking lots; garages in rear lane; narrow, slow speed streets) and pedestrian streets free of cars in special cases.(newurbansim.org)

Vehicle-Miles of Travel (VMT): VMT refers to vehicle miles traveled and is a standard measure of transportation activity. (Livable Communities Coalition