



Land Use Policies and Strategies for Expressway-Based Transit

A Review of the Literature and its
Applications for the Chicago Region

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Introduction

By 2040, the CMAP region is projected to grow by approximately 2.4 million people.¹ Today, the region faces significant mobility challenges as evidenced by increasing congestion, cuts to public transit, and deferred maintenance of critical transportation infrastructure. To address this, CMAP's GO TO 2040 Plan ("the Plan") identifies a set of priority transportation projects for the region, with a focus on bringing the existing system to a state of good repair. However, the set of priority projects also includes two highway extensions and three managed lane/multimodal corridor projects to add capacity to the system, each of which has the potential include transit. Bus-based solutions like Bus Rapid Transit (BRT) are one solution being evaluated to provide transit on these new and upgraded facilities.

BRT has garnered growing recognition as a flexible, cost-effective solution for addressing transit needs. BRT and express-bus services are also cited as solutions for serving polycentric regions and less densely developed suburban areas. In some cases, these expressway-based BRT systems are viewed as a transitional solution that is a precursor to rail. However, some regions have developed extensive BRT systems that are an integral part of the regional transit system and have been incorporated into land use policies and development initiatives.

Expressway-based BRT and placement of transit stations within or adjacent to an expressway creates unique problems for land use and urban design. The physical divide created by an expressway can make pedestrian access to stations difficult, new development often orients away from the noise and traffic of the expressway and toward arterials or parking lots, and some studies have indicated that air quality immediately adjacent to busy expressways can cause health problems. Additionally, employment centers are often not within walking distance of highway interchanges, individual buildings may be spaced too far apart to encourage walkability, and the overall densities on these corridors are lower than that required to support transit. However, expressways also provide access to many employment and activity centers in the region, and transit investments in these corridors offer the opportunity to serve populations and destinations that currently lack strong transit options. Institution of land use policies which encourage employment and housing clusters near transit and promote integration of transit into development can facilitate a transition in these corridors toward development patterns that are transit-supportive.

This report summarizes expressway-based BRT systems under evaluation in the region, provides a review of the literature related to land use planning for and the development impacts of BRT systems (on all road and transitway types), summarizes interviews with local developers about BRT-centered development, and offers case studies of land use and redevelopment policy initiatives related to expressway-based BRT systems in several US

¹ Chicago Metropolitan Agency for Planning. *GO TO 2040; Comprehensive Regional Plan*, (Chicago, IL, 2010). Accessed at <http://www.cmap.illinois.gov/2040/main>



regions. The goal is to provide a synthesis of current land use policies and outcomes related to expressway-based BRT and identify policies and strategies that may be impactful for expressway-based BRT systems within the Chicago Region.

Expressway-Based Bus Rapid Transit in the Chicago Region

Definitions of a Bus Rapid Transit (BRT) system vary.² The Federal Transit Administration (FTA) offers the most basic definition, defining BRT as “an enhanced bus system that operates on bus lanes or other transitways in order to combine the flexibility of buses with the efficiency of rail.”³ Other proponents argue that a BRT system must incorporate separate running ways, Intelligent Transportation System (ITS) components, and unique vehicles and branding to be a true BRT system. Most recently, the Institute for Transportation & Development Policy proposed a rating system for BRT networks⁴, with categories evaluating service planning, infrastructure, station design and station-bus interface, quality of service and passenger information systems, and integration and access. For the purposes of this report, a range of proposed “BRT” systems will be reviewed, from express bus to full-featured BRT.

Forms of BRT are currently being tested or analyzed for both existing and proposed expressways within the region:

- **I-55 Bus on Shoulder:** On November 7, 2011, Pace began a two-year Bus-on-Shoulder demonstration project on I-55 between Burr Ridge and Chicago, with destinations downtown, at the University of Illinois at Chicago and in the Illinois Medical District. In the spectrum of BRT typologies, this service is best described as an express bus. The demonstration is an interagency pilot project that includes Pace, IDOT, RTA and the Illinois State Police. An evaluation of the program will be completed during its second year, but preliminary figures indicate that the project has reduced bus travel times by 25 to 30 minutes between Plainfield and downtown-area destinations.⁵
- **I-90 Managed Lanes:** The Illinois Tollway and the Regional Transportation Authority (RTA) have completed a *Transit Value Planning Study* for the Jane Addams Memorial Tollway that evaluates options for inclusion of transit within two new managed lanes (one in each direction) that will be added during the reconstruction of the facility. This analysis also includes long term phase-in options for exclusive bus running ways. Pace is working on service planning for express bus and other transit options in the corridor.

² Weinstock et al. *Recapturing Global Leadership in Bus Rapid Transit: A Survey of Select U.S. Cities*. 2011. Institute for Transportation & Development Policy.

³ “Bus Rapid Transit,” Federal Transit Administration, Accessed January 19, 2011 at http://fta.dot.gov/about/12351_4240.html

⁴ Weinstock et al. (2011).

⁵ Pace Presentation to CMAP’s MPO Policy Committee. January 12, 2012.

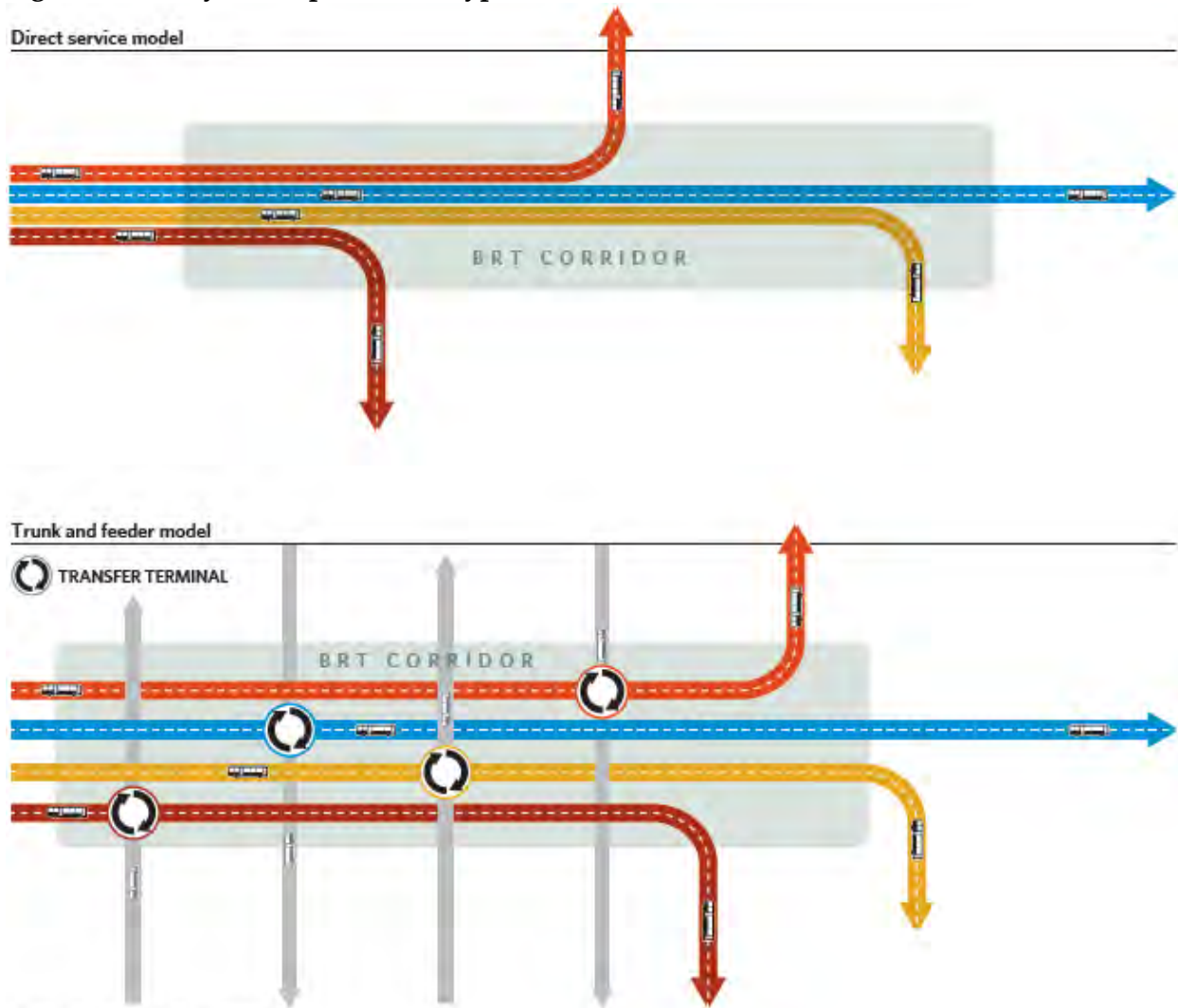


- **Proposed highway extensions:** The proposed Elgin-O’Hare Expressway Extension & Western Bypass and the Central Lake County Corridor (extension of Route 53 and bypass for Route 120) have the potential to include BRT or express bus as a transit option. The Elgin-O’Hare extension and Western Bypass project is in Tier II of the federal NEPA process and assumes set-aside of right of way for future transit options. While these transit options have not been fully analyzed, BRT is one option to provide service on the corridor. The Central Lake County Corridor is in the early evaluation stages, but the Tollway’s 53/120 Blue Ribbon Advisory Council has indicated that encouraging transit is a key goal of the proposed roadway. Preliminary discussions have indicated that bus-on-shoulder is the most likely near-term transit option for the corridor.

While the I-55 Bus on Shoulder example is part of a traditional, radial transit service that runs between a suburban area and a regional central business district (CBD), the remaining possible expressway BRT corridors in the region would primarily serve both suburban origins and destinations. Suburb-to-suburb transit trips provide a unique planning problem because employment centers and major anchors are dispersed along arterials, with fewer distinct destinations, low employment densities, and higher relative congestion levels. This paradigm makes provision of transit services that are competitive with travel in an automobile difficult. While supportive land use planning has been undertaken for a number of arterial bus corridors in the region, opportunities for integrating transit and land use in an expressway environment have been explored to a lesser extent.

There are also two distinct types of BRT service which may be utilized in the region: a “direct service” model and a “trunk and feeder” model. Nationally and internationally, most BRT systems operate on a “trunk and feeder” model, wherein local bus routes connect to a BRT route on a highway, exclusive busway or major arterial and a transfer is required to access the BRT line. This type of line acts similarly to a fixed rail line. In contrast, a “direct service” model allows bus or BRT lines to access the expressway BRT improvements for portions of their route and return to arterials to access key destinations that are not located near the expressway. Major arterials may also have select BRT improvements to improve travel times. This model takes advantage of the flexible routing of bus systems, has the potential to provide a single seat ride and may also be able to address the “last mile” problem for riders whose destinations are more distant from the expressway and main line transit services. However, it has slower running times, the service is often less competitive with automobile travel, and long-term evolution to a trunk-and-feeder model is generally desired. Figure 1 provides a schematic of direct service and trunk-and-feeder systems.

Figure 1. BRT System Operational Types



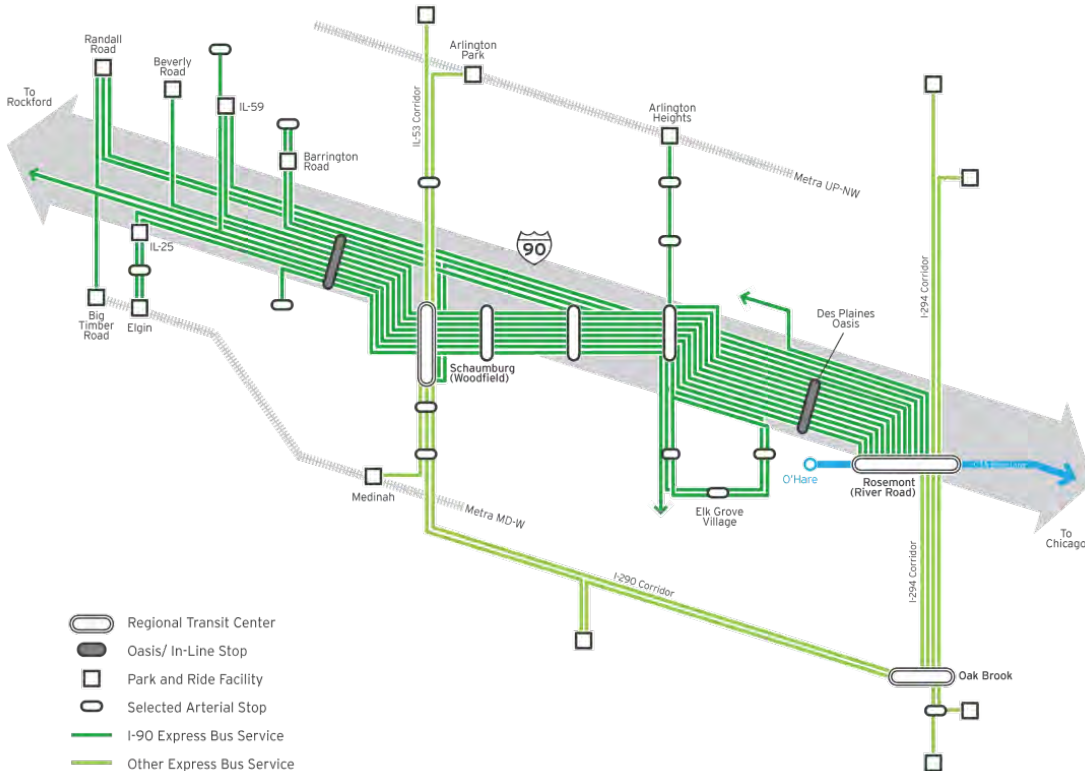
Source: Chicago Metropolitan Agency for Planning.

Source: CMAP

In an expressway context, these two types of BRT Systems have very different implications for supportive land use policies and potential land use impacts. In a trunk and feeder model, the BRT stations are likely to be within or directly adjacent to the expressway, are a node which other transportation modes feed into, and can often incorporate park & rides. These stations have the potential to serve as an intersection of multiple transportation modes, and the concentration of activities can often support a denser residential or commercial node that both depends upon and supports the transit services. In contrast, a direct-service model routes BRT service off the expressway and onto major arterials to serve existing destinations and corridors that are generally more auto-oriented. Stations near the termini of the BRT route are likely to have park & rides. While the BRT stations may be located within the expressway right of way, a number of stations will also be located on arterial roads to provide access to existing employment and activity centers. These arterial-based stations are less likely to serve as a convergence of transportation modes or play a role as major activity nodes.

As an example, Figure 2 below provides one possible bus-based transit service concept for Interstate 90 (I-90) in the northwest suburbs of Chicago. A transit market analysis indicated that the market would be best served by services that divert to arterials rather than remaining within the median of I-90. Many of the bus routes contemplated in this scenario would use I-90 for a portion of their route and return to arterials to access employment and activity centers, with the most diversions along Golf Road between Arlington Heights and Plum Grove/Meacham Roads. Major arterials that carry multiple bus routes are also candidates to receive BRT upgrades such as traffic signal priority and queue jump bypass lanes.

Figure 2. Transit Service Concept for the I-90 Corridor



Source: Illinois Tollway Authority and Regional Transportation Authority, Jane Addams Memorial Tollway (I-90) Transit Value Planning Study: Kennedy Expressway to Rockford, Accessed January 2012 at [http://www.illinoistollway.com/documents/10157/48742/2011-09-30+I-90 Transit Report final 2011-09-30.pdf](http://www.illinoistollway.com/documents/10157/48742/2011-09-30+I-90+Transit+Report+final+2011-09-30.pdf)

While the concept above assumes a significant amount of diversion of bus routes onto arterials, it also includes the potential for up to two in-line BRT/transit stations and up to 13 expressway-adjacent Park & Rides. Expressway-adjacent Park & Rides would be available in trip origin areas, while diversion onto arterials would occur in employment areas. Integrating planning for these BRT facilities with land use planning that supports the transit network is critical to building successful BRT services along this corridor.

Review of the Literature

Understanding the relationship between land use and expressway-based BRT systems is a critical step in creating successful expressway-based transit systems in the region. Since BRT is still considered a new system in the US and abroad, research has generally focused on refining the definition of BRT systems, service and operations planning, and the economic and land use impacts of BRT (as opposed to land use drivers of successful systems). Research has included extensive analyses of strategies that improve BRT travel times as compared to regular bus routes, understanding and improving the perception and utilization of bus-based transit systems, and making the case for the long-term positive economic impacts of BRT systems.

Discussion of Case Study Research

Most analyses of BRT systems and operations note the need for supportive land use planning and transit-oriented development (TOD). Significant investigation of the relationship between land use policies and BRT in the United States did not appear until the early 2000's.^{6,7} While none of these analyses focus on BRT within expressways, they do provide insight into appropriate land use policies for BRT systems. Figure 3 on the following page provides a summary of literature related to BRT and land use in developed regions. There is a large body of research on the land use drivers and impacts of BRT systems that is focused on strategies utilized in developing countries or swiftly growing urbanized areas, but application of these strategies to an area as substantially developed as the suburban expressway corridors in the Chicago region is difficult.

A 1996 set of international case studies from the Transit Cooperative Research Program (TCRP) provides one of the earliest analyses of land use and BRT.⁸ While the study focuses on the impact that the integration of land use policies and transit planning has on urban form, two of the six case studies focus on BRT systems. At the most proactive end of the spectrum, Ottawa-Carleton in Canada utilized regional land use goals to drive transportation planning, creating a set of transportation and land use policies that directed large developments to transit nodes, required integration of transit into new developments, and limited growth in areas without transit or transportation system access. In contrast, Houston, Texas developed a system where the transit system was adapted to serve an auto-oriented, polycentric region with policies promoting market-driven land use. Houston's METRO transit agency has significant powers to address mobility in the region, and has created two distinct transit systems (local bus and HOV-based express bus) to serve different transit trips, reach dispersed destinations, and reduce regional congestion. When considering the full set of case studies, the authors conclude that,

⁶ Herbert Levinson, Samuel Zimmerman, Jennifer Clinger, Scott Rutherford, Rodney L. Smith, John Cracknell and Richard Soberman, *TCRP Report 90 - Bus Rapid Transit Volume 1: Case Studies in Bus Rapid Transit*, (Washington, D.C., 2003).

⁷ Herbert Levinson, Samuel Zimmerman, Jennifer Clinger, James Gast, Scott Rutherford and Eric Bruhn, *TCRP Report 90 - Bus Rapid Transit Volume 2: Implementation Guidelines*, (Washington, D.C., 2003).

⁸ Dr. Robert Cervero and Jeffrey Zupan, *Public Policy and Transit Oriented Development: Six International Case Studies in TCRP Report 16: Transit and Urban Form, V2, Part IV*, (Washington, DC: National Academy Press, 1996).



Figure 3. Summary of Research Related to Appropriate Land Use for and the Development Impacts of Bus Rapid Transit Systems

Report / Article	Authors	Year	Key Conclusions Related to Land Use and Development near BRT
TCRP Report 16: Transit and Urban Form, V2, Part IV - Public Policy and Transit Oriented Development: Six International Case Studies	Cervero and Zupan	1996	Evaluated TOD for four LRT and two BRT corridors. Houston's bus transit system has adapted to serving a polycentric region where the market directs development, resulting in an effective system with minimal impact on regional or local urban form. In contrast, Ottawa provides an example of land-use driven transit planning that utilizes strict land use controls, high transit modal share objectives, direction of major development to transitway stations, and careful integration of transit access into site plans to impact regional and local urban form.
Mass Transit—Bus Rapid Transit Shows Promise	US General Accounting Office	2001	LRT has more proven benefits, but the scale and perceived permanence of upcoming BRT systems may be a factor in land use impacts.
Bus rapid transit: a viable alternative?	Polzin and Baltes	2002	Permanence is a concern for development near BRT lines, but established bus systems rarely change routing or remove routes. The authors argue that demand for TOD, the perception of land use impacts of BRT and the exclusivity of access to BRT are most important.
TCRP Report 90 - Bus Rapid Transit Volume 1: Case Studies in Bus Rapid Transit	Levinson et al.	2003	BRT-supportive land use should be encouraged near stations.
TCRP Report 90 - Bus Rapid Transit Volume 2: Implementation Guidelines	Levinson et al.	2003b	Busways have the most potential to stimulate development. Key tools include transit overlay districts, density bonuses and development incentives
Bus Rapid Transit Offers Communities a Flexible Mass Transit Option	US General Accounting Office	2003	An advantage of BRT is that it can respond land use changes or serve more dispersed suburban areas, but the perception is that LRT is a better catalyst for new development due to the highly visible capital investment required for rail lines.
Characteristics of Bus Rapid Transit for Decision Making	Diaz et al.	2004	Systems with major investment in both BRT and streetscape and related improvements have generated significant associated development.
Redevelopment and Revitalization Along Urban Arterials: Case Study of San Pablo Avenue, California, from the Developers' Perspective	Mejias and Deakin	2005	Developer interviews indicate that proximity to BRT was seen as beneficial, but was not a major factor in infill development decisions.
Bus Transit Oriented Development—Strengths and Challenges Relative to Rail	Currie	2006	The critical areas of improvement for Bus TOD development to be successful include development capability of the municipality/transit authority, reducing the stigmatization of BRT and regular bus services, minimization of noise and pollution impacts of the BRT line, and improved perception of the overall design and scale of BRT and local bus systems.

TCRP Report 118: Bus Rapid Transit Practitioners Guide	Danaher et al	2007	A review of literature indicates that busways have the strongest impacts on adjacent development. Developer surveys indicate that the most important factors influencing development near BRT stations were: permanence, agency commitment to BRT and lack of perception by developers that distance to transit drives development success.
Bus Rapid Transit: Planning Guide	Arias et al	2007	TOD principles should be utilized for BRT for station areas. A survey of developers and transit agencies indicates that the key factors impacting development potential are: permanence, frequency and reliability of service, local development climate/ease of development, associated streetscape and infrastructure improvements, and unique branding.
Bus Rapid Transit and Transit Oriented Development: Case Studies on Transit Oriented Development Around Bus Rapid Transit Systems in North America and Australia	Vincent and Callaghan	2008	Analysis of four case studies indicates that the following are critical to encouraging TOD around BRT stations: cooperation between public and private stakeholders, permanence, transit agency commitment, unique branding, frequency/speed/convenience, streetscape improvements for disinvested areas, access to markets with potential for high-density development, and the availability of incentives to speed the development process. Focus is on Busways and ART.
Land Use Impacts of Bus Rapid Transit: Effects of BRT Station Proximity on Property Values along the Pittsburgh Martin Luther King, Jr. East Busway	Perk and Catalá	2009	Analysis of the value of single family homes in Pittsburgh near the Martin Luther King, Jr. East Busway indicates rates of property value increase similar to those found near light rail line stations.
Bus Rapid Transit and Development: Policies and Practices that Affect Development Around Transit	Thole and Samus	2009	Provides case studies of land use and development policy in cities with BRT and/or LRT and analyzes development around stations. The authors conclude that BRT can spur significant economic development and land use change, but a local government/transit agency's role in encouraging this through land use policies is critical. Land use policies and development climate may be more important to development outcomes than creating the impression of permanence.
Recent Developments in Bus Rapid Transit: A Review of the Literature	Deng and Nelson	2010	Indicates the need for further analysis of the land development impacts of BRT, but does indicate that full-featured BRT systems can have positive impacts on land development.

among other factors, a shared regional vision for land use and transportation is required, as are a growing region, transit service that is competitive with the automobile, a transit-supportive culture, available re/development sites, and local and regional strategies to focus growth near transit. The preferred local and regional strategies include: placing major activity centers and public facilities near transit; creation of transit-friendly subdivision guidelines to encourage residential development within walking distance of transit; providing zoning tools such as density bonuses or transfer of development rights, creation of design guidelines, management and minimization of parking; and, utilization of redevelopment agencies to provide financing, land acquisition and other development assistance.

A 2008 report from the Breakthrough Technologies Institute, *Case Studies on Transit Oriented Development around Bus Rapid Transit Systems in North America and Australia*, provided international case studies of four busway and/or arterial BRT systems, two additional case studies of TOD in specific cities, and surveys and interviews of a set of developers and public agencies.⁹ The case study locations are: Brisbane, Australia; Cleveland, Ohio; Boston, Massachusetts; Ottawa, Ontario; York, Ontario; and, Los Angeles, California. The case study of TOD in the York region in Ontario, Canada provides the most insight for BRT that utilizes expressways and suburban arterials. The region chose to institute minimal, phased BRT improvements and instead focused on utilizing land use strategies to concentrate development in existing suburban corridors. Regional policy initiatives included a “Centres and Corridors” plan directing development toward existing regional centers, creation of TOD guidelines, creation of intensification targets for new development, and assistance to communities in creating station area and corridor plans.¹⁰ As noted, the report also included a summary of surveys and interviews of developers. Key drivers of successful BRT TOD from this analysis were: cooperation between public and private stakeholders, perceived permanence of and/or substantial public commitment to the BRT system, speed and convenience that differentiate BRT from regular bus systems, streetscape improvements in disinvested areas, and the availability of regulatory incentives for TOD rather than financial incentives.¹¹

A final set of case studies is provided in a 2009 Federal Transit Administration (FTA) report titled *Bus Rapid Transit and Development: Policies and Practices that Affect Development Around Transit*. As with the prior analyses, this report highlights BRT TOD policies in Ottawa, Los Angeles, and Boston, and adds New York, Pittsburgh, and Baltimore to the case study discussion. Critical policies from these cities that contributed to the success of BRT TOD include: parking management strategies, inclusion of BRT planning in coordinated redevelopment policies and plans, creation of special districts that promote TOD and/or provide development incentives, proactive joint development activities, provision of

⁹ William Vincent and Lisa Callaghan, *Bus Rapid Transit and Transit Oriented Development: Case Studies on Transit Oriented Development Around Bus Rapid Transit Systems in North America and Australia*, (Washington, D.C.: Breakthrough Technologies Institute, 2008).

¹⁰ Vincent and Callaghan, (2008), pp 73-74.

¹¹ Ibid, pp 7-8.

development incentives in less healthy real estate markets, and the existence of a “transit culture” that supports transit through both land use policies and transit investments.¹²

Multimodal Corridors

Although not focused specifically on land use related to BRT systems, a recent TCRP publication, *Reinventing the Urban Interstate: A New Paradigm for Multimodal Corridors*, provides insight into accommodating the needs of pedestrians, transit and automobiles in a multimodal, but highway-dominated, environment.¹³ The authors propose three types of “new paradigm” multimodal corridors based on non-competitive market segmentation between transit and the automobile: transit-oriented, park-and-ride access, and transit-optimized/freeway-constrained.¹⁴ Figure 4 below depicts the authors’ spectrum of multimodal corridor types and paths for transitioning to a transit-oriented multimodal corridor.

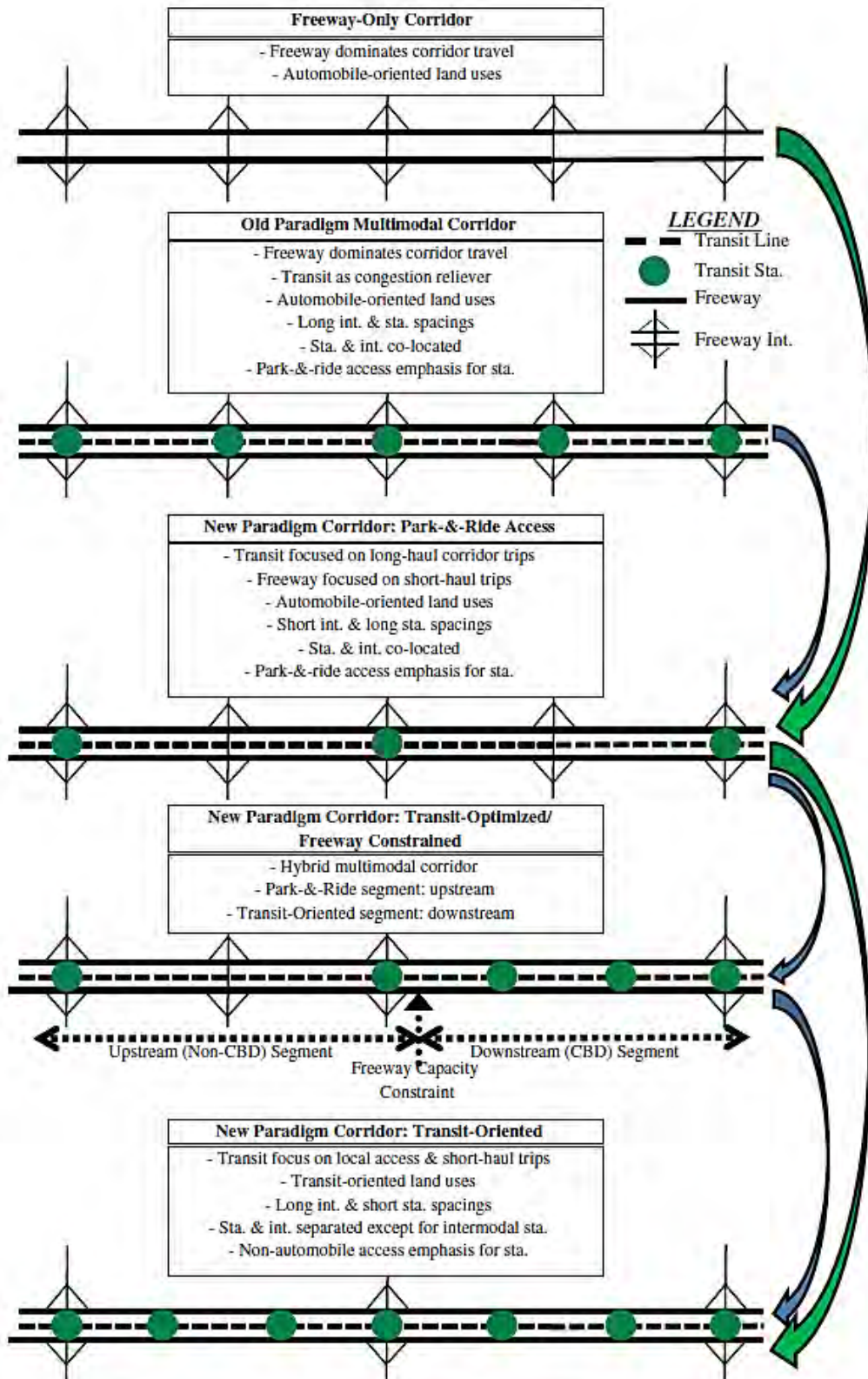
The report offers some direction on land use, reviewing both corridor-wide (anchors, jobs/housing balance, roadway alignment, and parking volume and management) and station-area specific factors (urban design, multimodal access, density, street grid patterns). Overall, it emphasizes that the goal should be transitioning to TOD in areas that are protected from the negative externalities imposed by freeways and freeway ramps. The authors also provide analysis indicating that the most impactful negative variable on transit ridership is placing stations within a quarter mile of freeway ramps, potentially due to the pedestrian access problems caused by freeway ramps, park & rides, and other auto-oriented urban design features. Suggested solutions include placing stations between arterials for fixed transit systems that run within freeway right of way and allowing freeway-adjacent systems or bus systems to divert to off-freeway centers that can encourage TOD in areas protected from automobile traffic.

¹² Cheryl Thole and Joseph Samus, *Bus Rapid Transit and Development: Policies and Practices that Affect Development Around Transit*, (Washington, DC: Federal Transit Administration, 2009).

¹³ Ferrell et al, *TCRP Report 145: Reinventing the Urban Interstate: A New Paradigm for Multimodal Corridors*, (Washington DC: National Academy Press, 2011)

¹⁴ Ibid, p4.

Figure 4. Multimodal Corridors and Paths to Developing TOD-Oriented Corridors



Source: Ferrell et al, *TCRP Report 145: Reinventing the Urban Interstate: A New Paradigm for Multimodal Corridors*, (Washington DC: National Academy Press, 2011), p 32.



Summary of Findings Related to Land Use and Development in BRT Corridors

Much of the research on land use and BRT has focused on the development impacts of arterial or busway BRT systems rather than expressway-based systems. However, taken with the research above, general principles have emerged from this body of research that can be applied to planning for BRT-appropriate land use regardless of the facility the system utilizes. These principles include:

Marketing and Image: While the following three factors are not specifically land use considerations, they do relate to policies that impact the public perception of BRT systems. These perceptions can impact ridership levels and the amount of development spurred by investments in BRT.

Permanence: One of the most significant obstacles that BRT systems face is the perception of a lack of permanence.^{15,16,17} While rail systems involve the installation of highly visible and costly infrastructure, many bus system improvements below the level of a dedicated busway or lane may be perceived as less of an investment or as potentially short-lived. While there is no concrete definition of the level of investment required to give an impression of permanence, it has been interpreted to mean that range of investments, from minimal investment up to dedicated bus rights of way. In contrast, Polzin and Baltes argue that “the level of planning and the market conditions that would support BRT investment are such that there should be very little prospect that the service would be abandoned.”¹⁸ More recent developer interviews have indicated that a strong, long-term transit agency and local government commitment to the BRT network can be as impactful as a major capital investment.¹⁹

Unique Branding: While branding of a BRT system is an operational factor, it can impact the public perception of a BRT system (as opposed to rail), encouraging both increased ridership and greater development activity.^{20,21} Branding elements can range

¹⁵ S. E. Polzin and M. R. Baltes, “Bus rapid transit: a viable alternative?” *Journal of Public Transportation* 5, no. 2 (2002): 47–69.

¹⁶ William Vincent and Lisa Callaghan, *Bus Rapid Transit and Transit Oriented Development: Case Studies on Transit Oriented Development Around Bus Rapid Transit Systems in North America and Australia*, (Washington, D.C.: Breakthrough Technologies Institute, 2008).

¹⁷ Alan Danaher, Herbert S. Levinson, and Samuel L. Zimmerman, “Land Use Development Guidelines” in *TCRP Report 118: Bus Rapid Transit Practitioners Guide*, (Washington D.C., 2007), Chapter 6.

¹⁸ Polzin and Bartes, (2002), p 60.

¹⁹ Vincent and Callaghan, (2008).

²⁰ Polzin and Bartes, (2002).

²¹ Vincent and Callaghan, (2008).



from unique signage and colors to “rail-like” vehicles and stops for BRT systems. Recent research has posited that this and other strategies that differentiate BRT from local bus service have an impact on perceived permanence and are critical to the success of a BRT line.^{22,23} Unique branding is a critical component of a marketing strategy, and helps to both advertise the service and make it easily identifiable.

Land Use Policies: Not all regions and cities with BRT actively plan for transit-supportive land use around their BRT systems. However, a range of the available tools and their effectiveness has been evaluated for both BRT and rail transit systems.

Transit Corridor Coordination: The most-cited examples of successful land use change related to BRT corridors are found in regions or cities (Ottawa, Boston, Pittsburgh) where redevelopment efforts have been coordinated across a transit line rather than on a station-by-station approach. Several cities (Denver, Los Angeles, Seattle) have recently commissioned studies that catalogue all rail and/or BRT station areas, collect population, employment, income, and land use data on those station areas, and categorize all stations for future development types and priorities.

Station Area Plans: Transit station, downtown and corridor plans are a public indicator of a jurisdiction’s intent for and investment in a transit station or corridor. They serve as a guide to the development community and can assist in promoting the image of a BRT station area.^{24,25} Completion of a station area plan can also highlight key development parcels, outline necessary regulatory and zoning changes, and provide implementation strategies for public actors to follow.

Special Zoning Districts: Special zoning districts that emphasize transit-supportive densities and decrease parking requirements around stations are one potential tool. Allowing transit-supportive land uses and densities “as of right” can shorten development timelines and increase certainty of the outcome of development proposals. Regulatory factors such as specialized zoning have been shown to have a larger impact than financial incentives on the success of TOD in some regions.^{26,27}

Parking Policies: Provision of parking creates a unique problem for transit station areas; park & rides are necessary in auto-oriented areas, but they can occupy significant amounts of land and make long-term transition to denser land use configurations

²² Taotao Deng and John D. Nelson, “Recent Developments in Bus Rapid Transit: A Review of the Literature” in *Transport Reviews* 31, no 1 (Aberdeen, UK: 2010), p 69-96.

²³ Weinstock et al., (2011).

²⁴ Polzin and Baltes, (2002).

²⁵ Graham Currie, “Bus Transit Oriented Development— Strengths and Challenges Relative to Rail” in *Journal of Public Transportation*, Vol. 9, No. 4, (2006).

²⁶ Vincent and Callaghan, (2008)

²⁷ Thole and Samus, (2009).

difficult. Planning for parking within station areas for both the short and long term is critical, particularly in areas where the goal is a transitioning to more dense land uses.²⁸

Design Guidelines: As with station area plans, design guidelines provide a rubric for the development community to use when planning for sites near BRT stations. These can also ensure that proposals for new development are in line with local desires while still meeting transit ridership and access goals.^{29,30}

Siting of Public Facilities and Activity Anchors: Siting employment nodes, public facilities and other major activity generators near transit allows access to these anchors. The sites for these types of anchors can be indicated in comprehensive plans or station area plans, negotiated with other jurisdictions or driven by redevelopment initiatives.

Coordinated Investments: BRT improvements can be implemented as part of a larger package of investments aimed at revitalizing an area. Some analysis indicates that, particularly in disinvested areas, installation of major streetscape improvements in tandem with the addition of a BRT line can lead to increased development activity.³¹ This type of major investment may also serve to increase the perceived permanence of a BRT system.

Development Climate: The ability to move projects through the development process efficiently and predictably is a major factor in development decisions. Development climate can incorporate a broad variety of factors, but those

Market Demand: As with any successful TOD project, demand must exist for higher density, mixed use districts.³² While rail TOD is growing in popularity and recognition, analyses have indicated developers do not widely perceive access to BRT alone to be a significant factor impacting development.^{33, 34}

Development Staff Expertise: In regions where municipalities, counties, or transit agencies play a significant role in development, the expertise and reputation of their development staff is seen as critical to the success of joint development and/or redevelopment projects. Significantly, development facilitation and partnerships in

²⁸ Ferrell et al, (2011).

²⁹ Cervero and Zupan, (1996).

³⁰ Vincent and Callaghan, (2008)

³¹ Cesar Arias, Angelica Castro, Wagner Colombini Martins, Paulo Custodio, Juan Carlos Diaz, Karl Fjellstrom, Dario Hidalgo, et al, *Bus Rapid Transit: Planning Guide* (New York, NY: Institute for Transportation & Development Policy, 2007).

³² Polzin and Baltes, (2002).

³³ Luis Mejias and Elizabeth Deakin, "Redevelopment and Revitalization along Urban Arterials: Case Study of San Pablo Avenue, California, from the Developers' Perspective," *Transportation Research Record* 1902, (Washington D. C., 2005), p 26-34.

³⁴ Currie, (2006).



other regions are completed by a broad array of actors, including transit agencies, counties, municipalities and specialized redevelopment entities.³⁵

Ease of Development: Developer interviews and surveys have indicated that the perceived ease of development in a jurisdiction is a critical factor. This includes development allowed as of right by existing zoning, the time involved in the pre-development approval processes, permit review timelines and fees, inspections, and the political climate related to new development.³⁶

Development Incentives: Monetary incentives can include land write-downs, municipal provision of some components of project infrastructure, and monetary contributions through tax increment finance or similar districts. Regulatory incentives include items such as density bonuses or expedited permit review processes. Developer interviews have indicated that regulatory incentives have more of an impact on development decisions than monetary incentives.³⁷ However, this does not hold true in areas where significant redevelopment of disinvested areas is needed.³⁸ Regulatory incentives are received “as of right,” have more certain outcomes, and can shorten the development timeline, which developers in good markets may view as more important than a less predictable monetary incentive.

Local Developer and Real Estate Industry Interviews

To follow up on the findings of developer interviews conducted in other regions, CMAP contacted local developers and real estate industry professionals to understand their opinion on the potential for development near expressway-based BRT stations and their perceptions of the permanence of BRT stations. Four interviews were completed, and the findings were generally in line with those of the studies noted above.³⁹ Overall, developers felt that providing transit access in expressway-based suburban commercial areas is critical to broaden the employment pool and enhance the attractiveness of commercial and industrial sites. Conclusions on the impact of expressway-based BRT on residential development were less concise, in large part due to the lack of a track record for BRT service in the region. Major conclusions include:

³⁵ Vincent and Callaghan, (2008)

³⁶ Ibid, (2008)

³⁷ Ibid, (2008)

³⁸ Ibid, (2008)

³⁹ Interviews were conducted with: Ron Lunt, a Partner with Hamilton Partners, a Chicago-area commercial real estate developer of commercial parks, including the Hamilton Lakes office complex on I-290 in Itasca; Steve Park, a Senior Vice President with Alter Group, a national developer of office, industrial, and institutional properties with experience in a number of Chicago-area developments; Paul Fisher of Centerpoint Properties, a national developer of industrial properties with a significant presence in the Chicago region; and, Matt Nix of Kinzie Real Estate, a residential, commercial, and mixed-use real estate and development firm based in Chicago.



Marketing and Image

Permanence: Interviewees generally felt that a bus system that is distinct from the basic Pace or CTA systems is necessary to generate development and ridership interest. Specifically, coach-style buses and enhanced amenities like wireless internet were noted as important for vehicles. For example, in the bus-on-shoulder demonstration project, Pace has provided unique bus wraps and buses with higher quality seating and wireless internet. Additionally, all interviewees noted the need for enhanced stations that are enclosed and shelter riders from the elements on all sides, are well-lit, and provide a strong brand for the BRT line. Some interviewees said that stations need to be on par with Metra stations to generate a better perception of permanence. Importantly, none of the interviewees believed that separate running ways were necessary to generate development interest in BRT station areas. Finally, one interviewee stated that he would prefer an indication of a transit-agency's long-term financial commitment for operations of the BRT system in order to develop in a transit-supportive format.

Operations: A fast, frequent and reliable service was cited as critical to the success of ridership and, therefore, development on a BRT line. In particular, BRT services in the region are envisioned to provide a stronger jobs-housing connection. Without predictable, timely commutes, riders cannot depend upon transit as a regular route to their place of employment. Similarly, it was noted that active transit agency involvement in resolving scheduling and connection issues is important. For example, requesting that bus drivers at major transfer points wait for a connecting route that is only a few minutes late can facilitate work commutes. Finally, collaborating on solutions to serve the "last mile" of a commute, such as creating business-park-specific shuttles, were important to provide a full commute.

Marketing: Interviewees felt that the BRT concept is very new to the region and that significant marketing and education would be necessary to encourage both ridership and development interest. For example, respondents indicated that access to rail transit is a proven residential market opportunity and is currently a major factor in obtaining capital for suburban multifamily residential developments. However, BRT is not a proven transit system for the region. To prove a market, interviewees suggested placing BRT stops in town centers that lack rapid transit. Pace's Bus-on-Shoulder demonstration project, which stops within the recently developed Burr Ridge Town Center and provides work commute access to downtown Chicago, is one example of this. The success and lessons learned from these stations can help to drive interest in development around BRT in the region. Finally, two of the four developers noted that employer location decisions are partly driven by access to employees. As a result,



these developers believed that successfully marketing a BRT system to employees could have the strongest impact on employer location decisions.

Land Use Policies

Station area plans: Developers noted that station area plans can provide an important indicator of a community's goals for a station area. For residential development, implementation-focused plans with an emphasis on quality of place were considered to be imperative to generate interest and investment in a BRT station area.

Zoning Updates: Three of the four interviewees stated that zoning updates that match the station area plan are critical to encouraging transit-supportive development. While plans broadcast intent, zoning shapes what type of development can occur and strongly influences the timeline of the development process. Regulations that were cited as critical to address were floor area ratio, height limits, mixed uses, density restrictions and parking.

Residential Density: Half of the interviewees felt that local concerns about density placed limits on development that was otherwise market-feasible. In particular, efforts to include multifamily residential development adjacent to office parks have been resisted by both municipalities and local school districts. However, developers felt that adjacent multifamily housing enhanced the employment pool and served as an attractor for a number of tenants. While interviewees desired to provide higher end housing for young or single professionals, they faced a perception that multifamily housing attracts high-cost, high service tenants. This points to a need to educate communities about the benefits of and market demand for multifamily housing.

Coordinated Investments: Improvements along a whole corridor, such as streetscaping, lighting, and pedestrian access, were an important factor in lending permanence to a BRT system. In addition, these were seen as an important element in placemaking for residential development.

Placemaking: Developers believed that a sense of place was important for TOD, particularly for residential development. In that vein, a system where expressway-based BRT accesses adjacent development was preferred over utilizing in-line stations.

Development Climate:

Market-driven development: As with all successful TOD, developers noted the need for a proven market for transit-accessible development. Because BRT is new



to the region, demonstration projects like the I-55 Bus on Shoulder initiative will be critical to proving interest in BRT Ridership. Developers noted the need to understand who is riding these buses and why in order to best understand the development opportunities.

Access to Employees: For commercial and office developers, access to a broad employment pool has a major influence on their ability to attract potential tenants. In industrial sectors, many employers seek an area with a benchmark number of applicants per job. High-quality transit services – bus or rail – can be a critical component of providing the requisite employment pool. Developers indicated that they would market access to a BRT system if it met the requirements for permanence noted above.

Regulatory Incentives: As noted above, zoning is a critical part of implementing transit-supportive development. Developers felt that aligning zoning and other and regulatory processes with the station area plan was a key factor in implementing TOD in general, rather than just for expressway-based BRT.



Expressway BRT and Land Use Case Studies

A number of regions within the US have well-developed expressway-based transit services, although many of these systems are rail rather than bus systems. The Chicago region actually led the country in developing transit within highway footprints, and opened the country's first such system in 1958. BRT or express bus systems on highways began later, with the first such systems developing in Houston and Los Angeles in the 1970s. Figure 5 below provides a summary of existing and under construction expressway-based transit systems in the US.

Figure 5. Expressway-Based Transit Systems in the United States.

Location	Line Name/ Designation	Opening Year	Transit / Roadway description	Station Types
Chicago	Blue Line (Eisenhower, Kennedy)	1958, 1970, 1984	HRT in Freeway median	In-line
Chicago	Red Line (Dan Ryan)	1969	HRT in Freeway median	In-line
Houston	Multiple lines - "Commuter Service"	Various	Bus / HOV / HOT lanes in freeways	Park & Ride, direct access ramps
Seattle	RapidRide, Sound Transit (on SR 520)		Existing: Express Buses with Freeway stations and Arterial stops Under Constr: HOV / Bus lanes	Existing: In-line with Park & Ride UC: Improved in-line elevated with Park & Rides
Los Angeles	El Monte Busway (now the Silver Line)	1974	Bus/HOV/HOT lanes in freeway	Adjacent with direct access
Portland	Red, Blue, and Green Line alignment on I-84 (MAX)	1986	LRT in Freeway Median	In-line and Adjacent
Washington DC	Orange Line	1986	LRT on HOV-restricted freeway	In-line with Park & Ride
Los Angeles	Green Line	1995	LRT in Freeway (non-radial line)	In-line with Park & Ride
Denver	Southeast Corridor	2006	LRT in Freeway (partial HOV tolls) - Park & Ride upstream, TOD towards CBD	Adjacent with Park & Ride
Los Angeles	Harbor Transitway (now the Silver Line)	1997	Bus / HOV / HOT lanes in freeway	In-line with Park & Ride
Portland	Red Line on I-205 (MAX)	2001	LRT in Freeway Median	In-line and Adjacent
Portland	Green Line on I-205	2009	LRT Adjacent to Freeway	Adjacent with Park & Ride
Minneapolis	Multiple lines - I-35W BRT	Under Construction	Bus / HOV lane in freeway	In-line
San Diego	I-15 Express Lanes Project	Under Construction	Bus lane / HOT / HOV in freeway	Park & Ride, direct access ramps
Denver	US 36 BRT	Under Construction	Bus / HOT Lane in freeway	In-line and Adjacent

Note: Only bus systems which provide multiple inline and/or expressway-adjacent transit stops have been included. Source: CMAP compilation of transit agency and municipal website information, press releases, and newspaper articles.

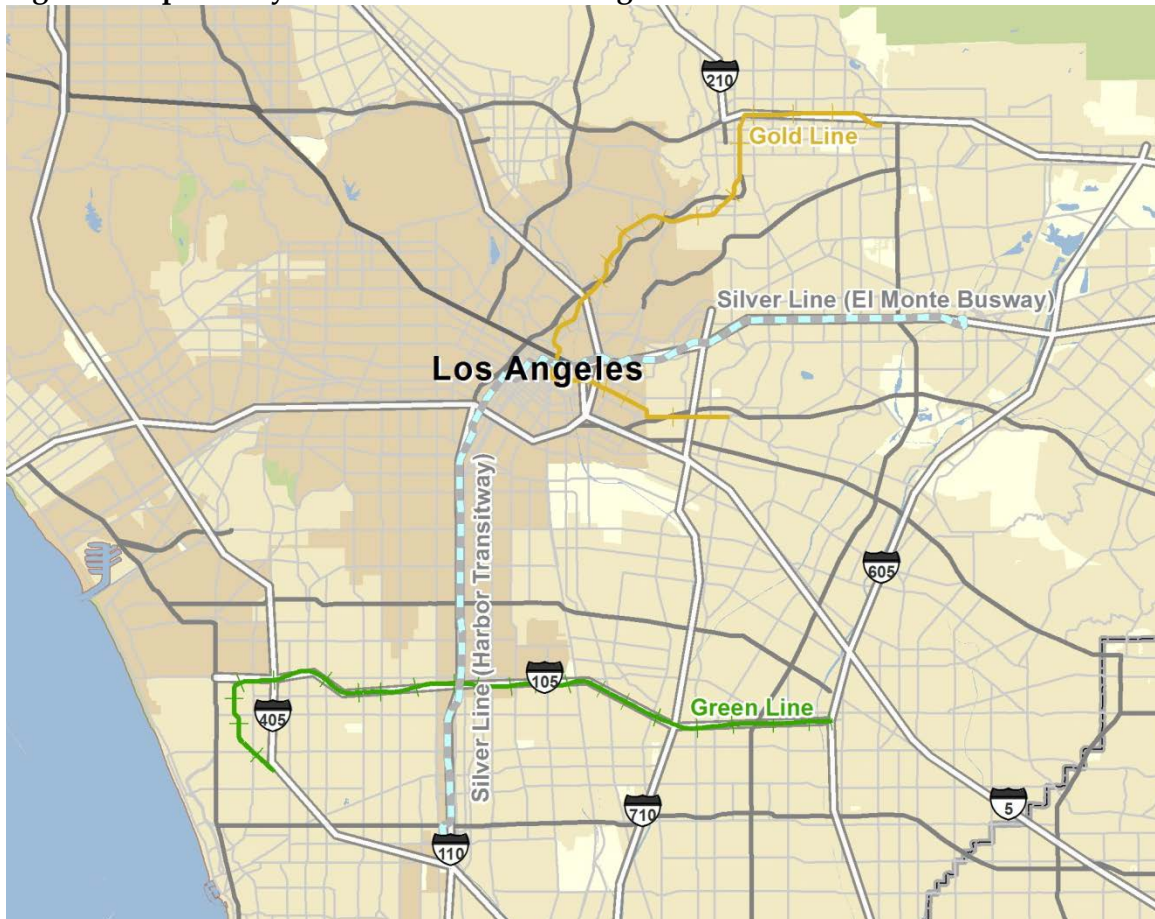


Rail transit systems located within expressways can offer some lessons for expressway-based BRT, particularly with regard to addressing the need to accommodate conflicting travel modes. While, they do not experience the perceptual barriers related to overall image, permanence, and public commitment, they can offer lessons related to land use policies and design strategies. The following case studies review Los Angeles and Denver, two regions with a mix of bus and rail transit services on expressways.

Los Angeles

Los Angeles has two BRT facilities and two rail facilities located within expressways: the Harbor Transitway, the El Monte Busway, the Green Line and a short section of the Gold Line. Metro bus routes utilizing the two BRT facilities were recently combined into a single BRT line and renamed the Silver Line. This designation elevates this BRT line to the same status as the five rail lines and the Orange Line BRT. Because it is a busway not located within an expressway right of way, the Orange Line BRT has not been evaluated in this analysis.

Figure 6. Expressway-based Transit in Los Angeles



Sources: Los Angeles County Metropolitan Transportation Authority, ESRI Business Analyst and CMAP

The El Monte Busway was constructed in 1974 and runs from Santa Anita Avenue in El Monte on the east to Union Station in downtown Los Angeles on the west. Carpools, vanpools, and motorcycles are also allowed to utilize the facility, but passenger minimums are higher than on the Transitway due to higher congestion levels on I-10. The Busway has only four stations: El Monte Transit Center (“Transit Center”), California State University Los Angeles (“Cal State”), Los Angeles County & University of Southern California Medical Center (“Medical Center”), and Union Station in downtown Los Angeles. All of the stations on the Busway are expressway-adjacent rather than inline. Only the El Monte Transit Center offers park & ride facilities, but it has the largest number of park & ride spaces in the County.⁴⁰ The Transit Center is accessed from a major arterial, serves as a transfer point for multiple transit services and modes, and currently serves approximately 20,000 passengers per day. Metro is working with El Monte to plan a major redevelopment for this Park & Ride and construction of a larger transit center that can accommodate up to 30,000 passengers per day is underway.⁴¹

The Harbor Transitway was completed in 1997 and accommodates both buses and carpools. The facility is located in the center of Interstate 110, beginning at the Artesia Transit Center and Gardena Freeway on the south and extending to Adams Boulevard on the north. While the neighborhoods near the Transitway are home to a lower income, transit-dependent population,⁴² ridership on the facility has fallen significantly short of projections, with potential causes including the lack of urban design and pedestrian features within stations and station areas, poor lighting and safety features, lack of supportive land use and TOD, low service frequency, competition from Metro Rapid buses and the Blue Line rail system, and the noise and exhaust at inline freeway stations.⁴³ As part of the Congestion Reduction Demonstration Project, headways have dropped to 5 minutes during peak periods, all stations received lighting upgrades, new signage will be provided at select stations, and sound barriers are being tested at a single station. This is a park & ride corridor, with inline-stations and park & ride facilities. In general, the stations on this corridor are located at interchanges on arterial roads with corridor commercial backed by moderate-density residential neighborhoods that predate Interstate 110. Some sections of the corridor have a predominance of industrial land directly adjacent to the freeway and/or the transit stations.

The Green Line light rail system was constructed concurrently with the Century Freeway and completed in 1992. Originally intended to connect bedroom communities southeast of Los Angeles with major employers in the aerospace industry southwest of Los Angeles, the line provides a suburb-to-suburb connection rather than a suburb-to-downtown connection. Due to

⁴⁰Los Angeles County Metropolitan Transportation Authority, *LA County Park & Ride Lots*, Accessed on January 19, 2012 at: http://www.metro.net/riding_metro/paid_parking/images/laCountyParkRideLots.pdf

⁴¹ Los Angeles County Metropolitan Transportation Authority, “Busiest Bus Only Station West of Chicago Expands,” Accessed on January 24, 2012 at <http://www.metro.net/projects/elmonte/>

⁴² Banerjee et al, “Highway Oriented Transit System: A Comprehensive Land Use/Transportation Strategy to Improve Transit Service Delivery, A Case Study of (I-110) Harbor Transitway Stations,” Accessed on January 24, 2012 at http://www.mettrans.org/research/final/99-22_Final.htm

⁴³ Los Angeles County Metropolitan Transportation Authority, “Busiest Bus Only Station West of Chicago Expands,” Accessed on January 24, 2012 at <http://www.metro.net/projects/elmonte/>



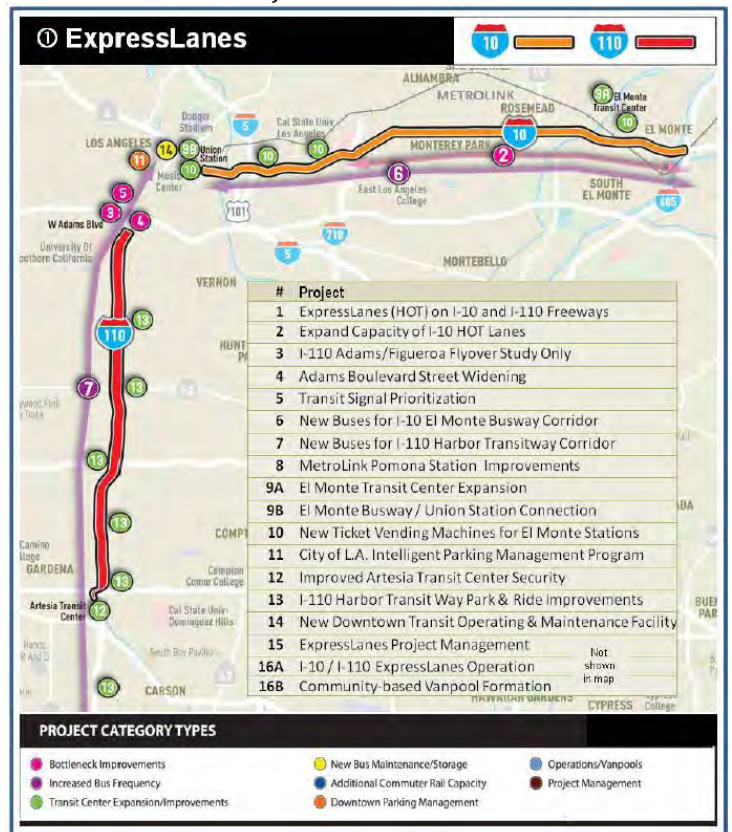
concerns about runway safety and other cost and engineering problems, a shuttle connection is required to access the airport Los Angeles International Airport (LAX). The Green Line has direct connections to the Silver Line BRT and the Blue Line heavy rail. While the TCRP Urban Freeways report classifies the Green Line as a “Park & Ride Corridor,” it also notes that the corridor has higher than expected employment densities when compared with the other freeway-based transit lines that access dense downtown destinations.⁴⁴ The authors posit that this may contribute to the higher ridership levels on the Green Line.

The Gold Line light rail was completed in 2003. It travels from downtown Los Angeles to Sierra Madre Villa station in Pasadena and contains three inline stations within Interstate 210. The area surrounding the expressway-based stations is predominantly moderate-density residential development. Since the construction of the line, the City of Pasadena has encouraged significant TOD around its stations.

Recent Developments in Los Angeles BRT

The Congestion Reduction Demonstration Project (“CRDP”) is a partnership between the US Department of Transportation, Los Angeles County, the California Department of Transportation (CALTRANS), the Los Angeles County Metropolitan Transportation Authority (Metro) and other local transit agencies. Planned improvements focus on reducing congestion on Interstates 10 and 110 through the conversion of HOV lanes to HOT lanes, improvements to transit stations and park & rides, addition of more rolling stock to increase service frequency, and the installation of BRT features such as signal prioritization (see Figure 7).⁴⁵ Patsaouras Transit Plaza, which serves as the Union Station access point for transit and shuttle services, will be rebuilt to improve connections between the El Monte Busway and Union Station. This package of improvements mirrors many of the branding and service components that are cited as critical to distinguishing BRT service from regular bus systems.

Figure 7. Los Angeles Congestion Reduction Demonstration Project Initiatives



Source: US Department of Transportation, “UPA/CRD Annual Report: Los Angeles ExpressLanes Projects,” Accessed January 19, 2012 at: <http://www.upa.dot.gov/docs/fhwajpo11043/arla2.pdf>

⁴⁴ Ferrell et al, p 28

⁴⁵ US Department of Transportation and the Federal Highway Administration, “Los Angeles Congestion Reduction Demonstration (“CRD”) Description,” Accessed on January 24, 2012 at <http://www.upa.dot.gov/crd/agreements/la.htm>

Creation of the Silver Line BRT was enabled by the CRDP. Prior to 2010, the El Monte Busway (the “Busway”) and the Harbor Transitway (the “Transitway”) served as facilities for multiple Metro express bus routes that terminated at opposite edges of downtown Los Angeles. A route on downtown streets now connects the Transitway to the Busway. When the combined line was created, most local bus routes utilizing the facility were either converted to feeder routes connecting to the Silver Line or combined to create the new Silver Line. Essentially, the Metro routes on the facility converted from a Direct Service model to a Trunk and Feeder model, although several Metro bus routes, other local transit operators, vanpools, and carpools still utilize the Busway and the Transitway. Under the ExpressLanes demonstration project, single-occupant vehicles will be charged to use the express lanes on the Transitway and Busway at all times, and vehicles with two occupants will be charged to use express lanes on the Busway during peak hours.

Land Use Policies and Tools

The Los Angeles region has a number of actors working to encourage TOD, including the City of Los Angeles, Los Angeles County, Metro, Caltrans, the Southern California Association of Governments (SCAG) and area municipalities. Although there is no central actor promoting TOD, several agencies and departments have taken leadership roles on specific aspects of promoting TOD through the institution of TOD policies, creation of a transit oriented development overlay zones, management of joint development programs, and creation of redevelopment areas near transit stations. The region also has strong history of utilizing interagency partnerships to further TOD.⁴⁶

TOD Planning

In 2011, Caltrans and Metro sponsored an analysis of TOD in Los Angeles by the Center for Transit Oriented Development (CTOD) titled *Creating Successful Transit-Oriented Districts in Los Angeles: A Citywide Toolkit for Achieving Regional Goals* (“the Toolkit”). The Toolkit includes significant analysis of existing conditions at 71 transit stations, each of which were classified into one of nine TOD categories based on employee/resident ratios and the density of the built environment. Focus group interviews and case studies were also completed to understand the barriers and opportunities for TOD in the region. While all rail lines and the Orange Line BRT stations were included in the station-specific analyses, none of the Silver Line stations are included except those that intersect rail line because the Silver Line was not created until after the report was well underway.

⁴⁶ Robert Cervero, Steven Murphy, Christopher Ferrell, Natasha Goguts, Yu-Hsin Tsai, G. B. Arrington, John Boroski, et al, *TCRP Report 102, Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects*, (Washington, DC, 2004).

One of the most important sources of funding for TOD planning in the region is provided to local communities by Metro via the Transit Oriented Development Planning Grant program. The objectives of the program are to increase access to and utilization of transit as well as reduce greenhouse gas (GHG) emissions. The agency prioritizes funding first to communities seeking to address regulatory constraints to the development of TOD, then to communities with planning needs that may be a precursor to regulatory change.

The recently-passed SB 375, a state senate bill mandating planning for growth that reduces greenhouse gas emissions by integrating land use, housing and transportation planning, also offers a platform for increased regional coordination and tools.⁴⁷ The Southern California Association of Governments, the designated Metropolitan Planning Organization for the region, will author a Sustainable Communities Strategy (SCS) to reach the GHG targets, but the strategy must be implemented at the discretion of local governments who may have different goals than those of the SCS. In particular, the authors of the Toolkit above note that the need to increase jobs and affordable housing near transit may not fit with community goals.

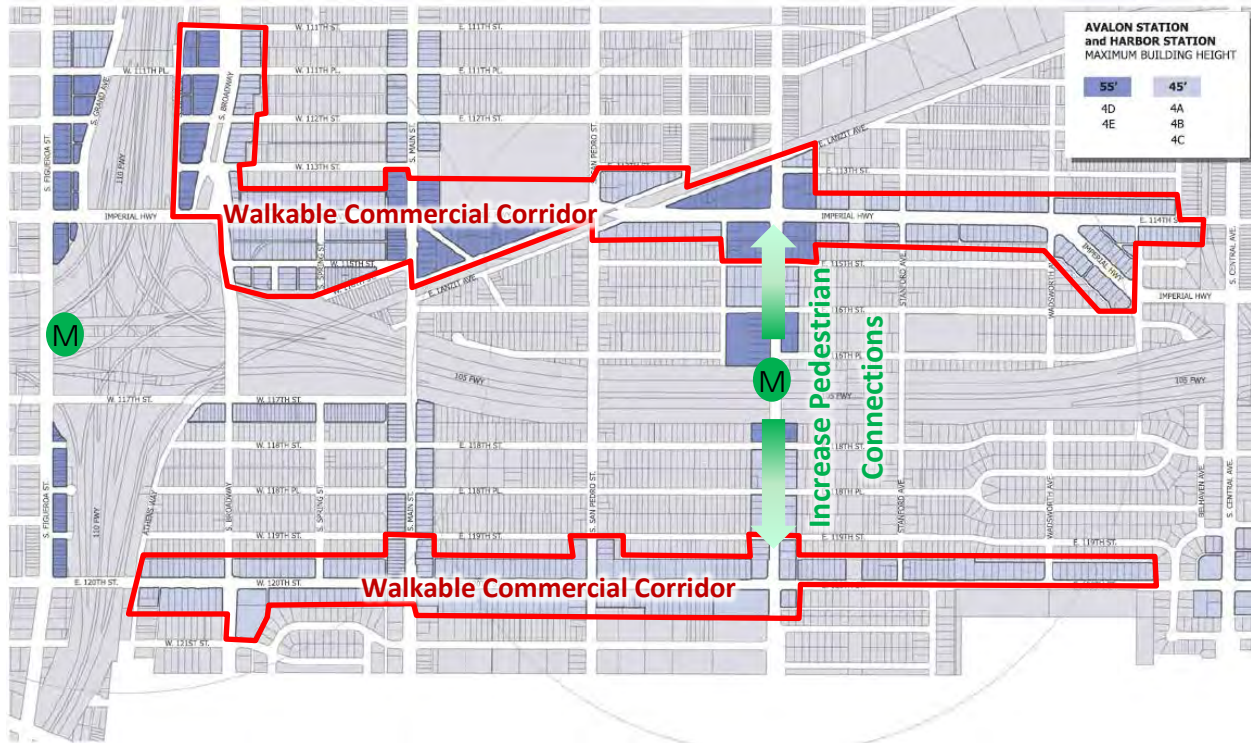
The City of Los Angeles recently completed a plan for 10 transit-oriented districts in South Los Angeles, four of which focus on expressway inline stations on the Green line. The plans were created under the RENEW program, which is a package of 10 health-based initiatives created to reduce chronic diseases rates by minimizing barriers to exercise and encouraging physical activity. The TOD plans under this initiative therefore focused on land use and urban design strategies that improve walkability and bicycle access. Recommendations follow a form-based code format to encourage urban design elements that will enable a transition to more walkable, pedestrian-friendly streetscapes. Since the City's zoning ordinance is not form-based, four development typologies were created that meet both existing zoning requirements and the form-based recommendations of the plan. To encourage increases in density and a mix of uses, density bonuses and parking requirement reductions are suggested in exchange for transit-and pedestrian-supportive elements. The RENEW plan calls for transitioning of auto-oriented corridors near the Century Freeway Green Line Stations to a "Neighborhood Village" typology.⁴⁸ This typology is comprised of multistory buildings on major corridors, moderate-density housing, and neighborhood-serving retail and services. Figure 8 provides the height limit map for two of evaluated Green Line stations. Recommended land use changes focus on providing a link from auto-oriented station areas to planned pedestrian corridors that are buffered from the negative externalities produced by the expressway.

⁴⁷ California Environmental Protection Agency Air Resources Board, "Sustainable Communities", Accessed on January 26, 2012 at <http://www.arb.ca.gov/cc/sb375/sb375.htm>

⁴⁸ City of Los Angeles. "RENEW Transit Oriented Districts Plan" (February 12, 2012 DRAFT), Accessed on March 15, 2012 at <http://cityplanning.lacity.org/staffrpt/initialrpts/CPC-2008-1552.pdf>



Figure 8. Future Development height limits for the Green Line Avalon and Harbor Station Areas



Source: City of Los Angeles, “RENEW Transit Oriented Districts Plan” (February 12, 2012 DRAFT), Accessed on March 15, 2012 at <http://cityplanning.lacity.org/staffrpt/initialrpts/CPC-2008-1552.pdf>

Special Zoning Districts

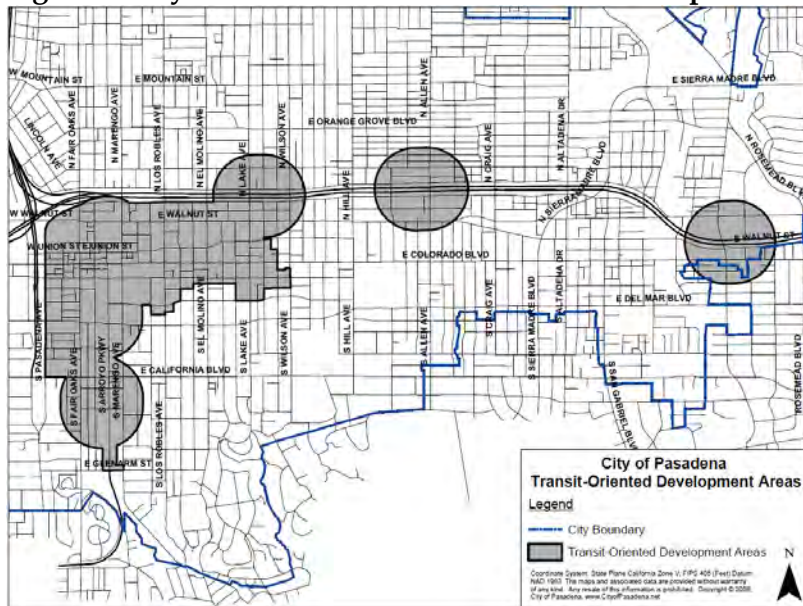
The Los Angeles region has multiple special zoning districts that can be utilized to encourage TOD. In unincorporated areas, Los Angeles County has a TOD overlay zone, which it has utilized for four blue line stations and two green line stations. The overlay zone generally encompasses areas within one half mile of a station and provides guidelines that promote pedestrian amenities and transit-supportive development that fit the context of the surrounding neighborhoods. Density bonuses are provided for infill development and lot consolidation.⁴⁹ Los Angeles County has recently undertaken significant efforts to encourage transit-supportive development along the Green Line, including creation of TOD overlay districts at two stations. The City of Los Angeles does not have a TOD-specific zone, but is creating TOD Policy Plans and specific area plans for station areas highlighted by the Toolkit. The density requirements of these specific area plans are then incorporated in the comprehensive plan and guide development in the neighborhood.

Finally, a number of local communities have enacted TOD districts or design guidelines that provide special guidelines for development near transit. For example, Pasadena, which is

⁴⁹ County of Los Angeles,

located on the Gold Line, has defined “Transit-Oriented Development Areas” as land located within ¼ mile of a light rail transit station. For some specific area plans, this definition has been expanded to a ½ mile radius.⁵⁰ New developments within these boundaries must meet the guidelines for Transit Oriented Development land uses. Studies have indicated that, along the Gold Line, the proximity of development to the station is even more important than the pedestrian environment in promoting transit usage.⁵¹

Figure 9. City of Pasadena Transit Oriented Development Areas



Source: City of Pasadena, “Transit-Oriented Development Areas”, accessed on February 12, 2012 at <http://www.cityofpasadena.net/WorkArea/DownloadAsset.aspx?id=6442455473>

Station Area Redevelopment

Redevelopment near transit stations can occur through three main paths: the Los Angeles County Metropolitan Transportation Authority’s (Metro) Joint Development Program, a local Redevelopment Agency, or a municipal or County-driven process. Redevelopment agencies have recently been dismantled in California, although options to create new entities that perform some of their functions are under discussion. While Los Angeles has experienced significant residential development near expressways, less has occurred in expressway-based station areas. Indeed, a number of expressway-based stations are in areas that have historically experienced high levels of disinvestment or are seen as undesirable because the expressway is

⁵⁰ Pasadena Zoning Code, Ord 7000, (2005), Accessed on May 24, 2012 at <http://ww2.cityofpasadena.net/zoning/P-5.html#17.50.340>

⁵¹ Holly Lund and Richard Wilson. “The Pasadena Gold Line: Development Strategies, Location Decisions, and Travel Characteristics along a New Rail Line in the Los Angeles Region.” (San Jose, CA: 2005). Accessed on May 24, 2012 at <http://www.reconnectingamerica.org/assets/Uploads/bestpractice213.pdf>

elevated above adjacent neighborhoods. The most successful programs have been in Pasadena and

Metro has an active joint development program for bus and rail transit stations in the region. The program has dual goals: “Encourage comprehensive planning and development around station sites and along transit corridors; Reduce auto use and congestion through encouragement of transit-linked development.”⁵² Available land is targeted for joint development based on the priorities of Metro’s board, and joint development opportunities can arise from Board discussion or from suggested action by staff. Generally, sites targeted for joint development have access to multiple transportation modes and/or transit routes. For park & ride developments, the emphasis is on natural transition points to catch park & ride patrons.⁵³ On the Silver Line BRT, redevelopment planning is underway for a 22-acre site adjacent to the El Monte station on land that is currently a mix of parking, local and transit agency work yards, and industrial uses. The proposed El Monte Gateway is significantly smaller than the prior proposal for the site, and officials expect that the development will take at least 5 to 10 years to build out. Most stations on the Silver Line access neighborhoods and regional facilities that predate facility, and large parcels of Metro-owned land are not available for joint development. Interviews indicate that Union Station and El Monte Station are the priorities for redevelopment and TOD initiatives because they serve as anchors to the line and intersections of multiple transit modes.⁵⁴

Los Angeles County has also driven some recent redevelopment projects. The most notable of these is a mixed-use redevelopment project near Aviation Station. Construction of a mixed-use development is also underway, furthered by a partnership of Metro, Caltrans, the City of Los Angeles and Los Angeles County. Planning for the project required significant interagency cooperation - the project involves land owned by the County and Metro, will require deannexation of land within the City of Los Angeles, and will also lead to relocation of a Metro bus depot.

Marketing and Permanence

The creation of the Silver Line was advertised through Metro’s blog and press releases. The color designation of the line was a significant step in itself, as only train lines and the Orange Line BRT (a busway) have color designations. The Silver Line improvements are also a part of the Los Angeles’ region’s Congestion Reduction Demonstration Project, which has an ongoing advertising and public outreach campaign. However, Metro does not highlight specific corridors in its marketing, so ongoing marketing initiatives specifically focused on the Silver Line have not taken place. In response to routing reconfigurations, creation of the new Silver

⁵² Los Angeles County Metropolitan Transportation Authority. “Joint Development Program.” Accessed on February 12, 2012 at http://www.metro.net/projects_studies/joint_development/images/joint_dev_project_fact_sheet.pdf

⁵³ Alexander Kalamaros (Transportation Planning Manager, Real Property Management & Development, Los Angeles County Metropolitan Transportation Authority) in discussion with CMAP Staff, January 2012.

⁵⁴ Alexander Kalamaros (LA Metro Staff), Interview with CMAP staff on January 30, 2012.



Line brand, and a larger trend toward transit usage in the LA area, ridership on the line has nearly doubled since 2010.

Denver

The Denver Region is in the process of completing a significant expansion of transit facilities through the FasTracks program. This project will bring a total of 122 miles of new commuter rail and light rail, 18 miles of BRT, and 21,000 new parking spaces at transit stations throughout an 8-county service area. The BRT project is located on US 36, a limited-access expressway that connects Denver and Boulder and is known as the Denver-Boulder Turnpike. BRT improvements on US 36 include up to 6 stations, bus pullouts, slip ramps and pedestrian overpasses on an 18-mile corridor. The project recently received Transportation Infrastructure Finance and Innovation Act (TIFIA) financing to allow for the construction of new managed lanes, creation of BRT services, and the addition of the U.S. 36 Bikeway. BRT services on U.S. 36 will utilize the newly-constructed managed lanes and stations will be a mix of inline, adjacent, and arterial-based.

The U.S. 36 corridor has many similarities to I-90 west of O'Hare. The facility serves as an employment center and, excluding the Denver section is home to approximately 80,000 jobs.⁵⁵ Development began after the facility was completed in 1951 and has followed typical suburban patterns. Proposed station areas have a significant amount of big-box retail and auto-oriented office development and must be adapted to support the proposed BRT system. The BRT corridor crosses multiple municipalities and, in some cases, station area planning must be completed across jurisdictions. Most proposed station areas currently have TOD plans, and major redevelopment has been planned for two existing, aging commercial areas that will receive BRT stations (see Westminster Mall aerial below). The BRT line builds on existing express bus service on the corridor, which has grown over several decades and is supported by 36 Commuting Solutions, an organization that promotes transit usage in the corridor.

Figure 10. Westminster Mall Redevelopment Site, U.S. 36 BRT Corridor



Source: City of Westminster, "Westminster Urban Reinvestment Project." Accessed on April 5, 2010 at <http://www.westminstercenter.us/Portals/1/Repository/Documents/wcsitemap.pdf>

⁵⁵ Colorado Department of Transportation, "US 36 Environmental Impact Statement." Accessed on February 12, 2012 at <http://www.coloradodot.info/projects/us36eis>

Denver's Southeast Corridor houses four light rail lines and is located within Interstates 25 and 225. The corridor was completed in 2006 as part of the Denver Transportation Expansion project (T-Rex) which also added capacity to both I-25 and I-225. Under the T-Rex project, these expressways were widened to carry as many as 5 lanes in each direction and now carry more than 200,000 vehicles per day.^{56,57} To cross this expanse and provide access to the new transit lines, pedestrian bridges were constructed. The line is located within a predominantly suburban corridor, with large concentrations of office and residential development dating to the early 1960's. Direct connections are provided to both downtown Denver and the Denver Tech Center, a major employment corridor located along I-25 south of I-225.

Figure 11. Denver's Southeast Light Rail Corridor



Source: Denver Regional Transportation District, "T-REX Transit Oriented Development: Lessons Learned Report," Accessed on April 5, 2012 at <http://www.rtd-fastracks.com/media/uploads/main/TREX-TOD-LL.pdf>

Land Use Policies and Tools

The City and County of Denver, RTD, and local municipalities have actively planned for new development in station areas and, conversely, to orient new transit to walkable development.

⁵⁶ Metro Denver, "Metro Denver's multi-modal T-REX takes last step," accessed on February 13, 2012 at <http://www.metrodenver.org/news-center/metro-denver-news/T-REX.html>

⁵⁷ Colorado Department of Transportation, *Traffic Volumes Map*, accessed on February 13, 2012 at <http://apps.coloradodot.info/dataaccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>

Since several of the region's recent transit expansion projects have been constructed within expressway right of way, the experiences in Denver offer some insight for expressway-based BRT in the Chicago region.

TOD Planning

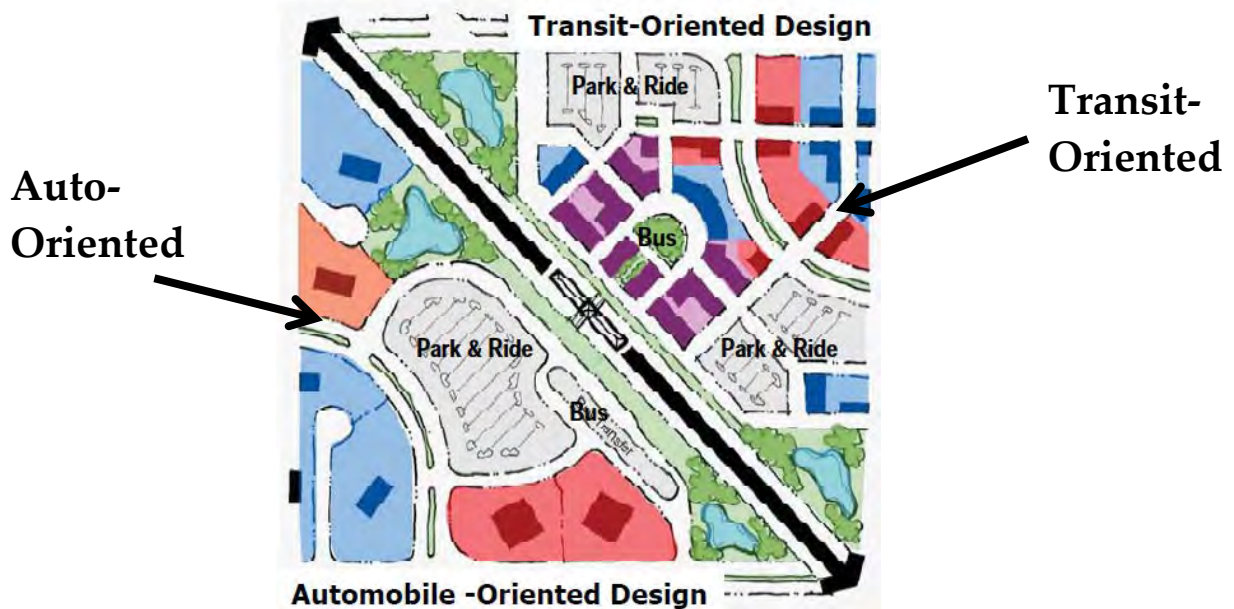
Like Los Angeles, the City and County of Denver have a TOD plan that encompasses most of the transit stations in the city. The plan was completed in 2006 and the major goals were to: set priorities for allocation of City resources over time; identify tools, policies and strategies to implement TOD; and to coordinate intra-City efforts to plan and implement transit and TOD.⁵⁸ On the Southeast Corridor, the TOD plan analyzed all stations within the City of Denver, for a total of 9 of the 14 stations. On the US 36 BRT Corridor, the single station within the City was included in the plan. RTD also requires TOD planning for all new station areas, which, given the rapid expansion of Denver's transit system, has led to station area plans for a majority of the region's transit stations. Planning for transit-support development in the region has evolved since the Southeast Corridor, which was one of RTD's first major TOD efforts. As a preliminary part of the U.S. 36 TOD planning process, all stations in the proposed corridor were evaluated and ranked for the TOD potential. The need for park & ride facilities in areas with TOD potential was noted as a challenge for some sites.

RTD is a major actor in encouraging TOD planning outside of the City of Denver. The agency approaches TOD planning with a philosophy of "development-oriented transit," a paradigm which seeks to reduce the auto orientation of many transit station areas. This is accomplished by breaking up large parking lots and locating them within development and/or away from the station, prioritizing transit, bicycle and pedestrian access, and locating development adjacent to a station. "The Northwest Rail Corridor and US 36 BRT Development Oriented Transit Analysis" cites Metra's Elmhurst, LaGrange Road, and Arlington Heights stations as examples in the Chicago region where parking has been successfully integrated into adjacent buildings and/or located away from the center of the station area.⁵⁹ Figure 12 below provides an RTD schematic of an auto-oriented station area and a development-oriented station area.

⁵⁸ City of Denver Department of Community Planning and Development, *Transit-Oriented Development Strategic Plan*, (Denver, CO, 2006)

⁵⁹ Denver Regional Transportation District, *Northwest Rail Corridor and US 36 BRT Development Oriented Transit Analysis*, p2-1, (Denver, CO, 2007).

Figure 12. RTD Illustration of an Auto-Oriented Station and a Transit-Oriented Station



Denver’s RTD provides this graphic to contrast development-oriented transit with auto-oriented stations. The area on the upper right represents “development-oriented transit.” In this paradigm, development and transit transfers take priority at station entrances, and parking is decked and/or placed to either side of the station. Source: Denver Regional Transportation District, Northwest Rail Corridor and US 36 BRT Development Oriented Transit Analysis, p2-1, (Denver, CO, 2007).

Overall, development-oriented transit seeks to make a transit station an integral part of a community, and planning focuses on a long-term transitioning of station areas from park & ride to community center. RTD utilizes seven design principles in its development-oriented transit planning:

- 1) Stations as the Heart of the Community
- 2) Connect Neighborhoods with Transit
- 3) Create a pedestrian environment
- 4) Manage traffic
- 5) Balance Parking
- 6) Create Partnerships
- 7) Complete community objectives

As part of the DOT process, RTD encourages local jurisdictions to complete TOD planning for all new station areas. The plans for the Route 36 BRT corridor reflect a significant TOD orientation; stations closest to Denver have a redevelopment focus, replacing older shopping malls and commercial areas with mixed-use developments oriented to the transit stations; more distant station areas have mixed-use zoning in place or projects already underway. In planning for the Route 36 BRT corridor, RTD specifically addressed the question of transit mode’s impact on TOD potential. The analysis provided several key conclusions:⁶⁰

⁶⁰ Ibid. See Chapter 3 for a brief discussion of TOD principles across modes, RTD’s broad TOD recommendations, and a high-level review of the unique physical and access issues posed by expressway-based transit.

- Rail-based TOD principles are equally applicable to BRT-based TOD
- An overarching vision and supporting policies should be established
- Focus on pedestrian-oriented design and planning for walkable station areas
- Higher levels of investment generate more TOD potential
- Treat the transit corridor as an “integrated system”

Finally the report recognized that expressways create a physical environment where TOD may be one-sided or somewhat inaccessible. Addressing connections across U.S. 36 and promoting walkability in an expressway environment was seen as a central problem in planning for TOD in the corridor. The report recommended that pedestrian linkages across the expressway and to stations and TOD areas be provided. For example, pedestrian linkages across the Busway and expressway in Ottawa, Ontario, Canada were highlighted as shown below.

Figure 13. Pedestrian Connections across Expressways and to Transit in Ottawa

The Ottawa Transitway system connects various land uses in the corridor through pedestrian overpasses and a series of pathways.



Source: Denver Regional Transportation District, *Northwest Rail Corridor and US 36 BRT Development Oriented Transit Analysis*, p3-1, (Denver, CO, 2007).

The Southeast Corridor provides a second example of planning for expressway-oriented transit in the Denver region. RTD has conducted extensive follow-up analyses of successes and failures on the Southeast Corridor, including an analysis of the TOD planning and implementation process. Findings from this report are most applicable to planning for TOD on new transit lines in general rather than on expressway-based transit lines. Conclusions include the need to educate developers on the benefits of TOD, allowing flexibility in the EIS for the final design of station areas with potential for major redevelopment, and establishment of station area plans and zoning code revisions prior to completion of the EIS to allow for better integration of TOD planning and the guidelines established in the EIS.⁶¹

⁶¹ Denver Regional Transportation District, “T-REX Transit Oriented Development: Lessons Learned Report,” (Denver, CO, 2007).

Station Area Redevelopment

RTD policy encourages joint development to “increase ridership, provide an opportunity for enhanced transit infrastructure, and support the development of livable communities.”⁶² The proposed development must utilize TOD characteristics, improve the operations of and access to transit, and not limit RTD’s access to transit facilities. State legislation was passed in 2010 that allows the development of housing on RTD property, and the agency has also recently revised its Strategic Plan for TOD to partner on joint development projects that encourage affordable housing in line with local plans. However, given the short history of joint development in the region and current economic conditions, RTD has participated in few joint development initiatives.

A case study of the Southeast Corridor indicated that, while RTD worked with developers extensively to ensure a transit orientation in new developments, TOD investment in expressway-based station areas has proved inconsistent. For example, in an effort to minimize the negative externalities of the expressway, a number of new developments oriented away from the station, therefore limiting transit accessibility. Furthermore, a number of new office developments followed typical suburban patterns, with multistory buildings surrounded by parking rather than oriented to the transit station. Finally, in many areas, the occurrence of development appeared to be dependent upon the existence of large, available sites rather than TOD plans. However, a number of municipalities were also able to use the new transit access as an impetus for higher densities, and rents have reportedly been higher in transit-adjacent developments. Transit access also resulted in some cases in more pedestrian-friendly designs, with added walkways and access points as well as a more human scale. The major issue was consistently promoting TOD and ensuring transit accessibility rather than just transit adjacency. Overall, the case study characterizes TOD in the Southeast Corridor as a good “first generation” effort that provided examples for the region and proved some of the benefits of TOD.⁶³ It is important to note that most stations in the more recent U.S. 36 BRT system are sited adjacent to the expressway rather than within it, providing greater potential access to adjacent development.

In the Denver region, municipalities also play an active role in station area development. As part of the station area planning process, municipalities are encouraged to revise zoning ordinances and policies to reflect the station area plan. They are also the main driver behind major redevelopment initiatives that do not involve RTA-owned land. For example, the city of Westminster has actively worked to redevelop the former Westminster Mall, located on US 36 between a BRT station and a proposed light rail station. Its efforts have included station area

⁶² Denver Regional Transportation District, “Strategic Plan for Transit Oriented Development,” p 3-13. (Denver, CO, 2010). Accessed on April 5 2012 at http://www.rtd-fastracks.com/media/uploads/main/TODStrategicPlan-final_090210.pdf

⁶³ Center for Transit Oriented Development, “Rails to Real Estate: Development Patterns along Three New Transit Lines,” Accessed on April 5, 2012 at <http://www.reconnectingamerica.org/assets/Uploads/CTODR2RFinal20110321.pdf>



planning, land acquisition, and developer solicitation. Other communities, such as the City of Broomfield, have created special transit-oriented development areas and standards. As with the Chicago region, local communities must implement TOD through local efforts such as station area planning, zoning codes, redevelopment planning, and similar initiatives.

Marketing and Permanence

The U.S. 36 BRT line has involved significant and visible investment in the form of new stations, Park & Rides, and pedestrian overpasses. Additionally, both transit and TOD planning processes have involved significant community outreach. However, an organization called U.S. 36 Commuting Solutions and its partner organization, the U.S. 36 Mayors and Commissioners Coalition, also work solely to educate the public about commuting options on the corridor. Their website provides in-depth information on commute options, commuting incentives, and upcoming transit projects on the corridor. The organization also runs a workplace ambassador program to encourage transit, rideshare, bicycle, and other alternative commute strategies. Programs of this type encourage ongoing education about the benefits of commuting via transit and can help to keep transit options front and center in area workplaces.

Conclusions and Next Steps

While efforts to evaluate appropriate supportive development for expressway-based BRT have been limited, the body of case studies and literature on closely related topics offers important insights for the CMAP region. First, accepted supportive development for BRT systems does not appear to differ significantly from rail-based TOD. However, unique strategies must be used to address the negative externalities imposed by the expressway environment. Most importantly, placing stations in areas where supportive development can be encouraged and connections to existing development created will be critical. While the Chicago region has a strong history of placing expressway-based transit stations within the center of the expressway, this model has strong negative impacts on TOD potential. Instead, expressway-based systems should consider siting stations adjacent to the expressway, between interchanges, or set away from the expressway in existing centers. These forms will allow for creation of a more pedestrian-oriented, mixed-use area that is somewhat buffered from the expressway environment.

Finally, BRT is a new transit mode for the region, and significant marketing and outreach may be required with both potential riders and developers to ensure the success of these systems. Local developers noted that the Pace's Bus on Shoulder Initiative on I-55 is strong first step, and that lessons should be taken from its successes and failures to better develop other expressway-based BRT systems in the region. Similarly, some investment will be required on the part of transit providers and local municipalities to provide an impression of permanence and encourage the kind of long-term investment that takes place around rail stations. While



literature review and developer interviews have indicated that separate running ways are not required, unique branding, upgraded vehicles, and specialized stations were seen as an important marketing element. Without features that enhance the perceived permanence of a BRT line, it is unlikely that significant development activity will take place around expressway BRT stations.

Strategies to address supportive land use in these topic areas are further explored in the Expressway-based BRT Policy and Strategy Guide that is a companion to this document. The Guide provides strategies and policies for both municipalities and transit providers to consider when planning for expressway-based BRT. In addition to that document, CMAP plans to continue to work with transportation providers and municipalities to implement supportive land use around planned BRT and express-bus systems in the region. Proposed expressway-based BRT systems are an important component of the fiscally constrained capital projects in GO TO 2040, and encouraging supportive land use around these systems helps to further livable communities in the Chicago region. Ongoing work may take the form of assistance through the Local Technical Assistance Program, future research on related topics, and dissemination of the findings of this report.



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Front cover image courtesy of Pace.

Images courtesy of (clockwise from upper left): Dorothy Peyton Gray Transportation Library and Archive at the Los Angeles County Metropolitan Transportation Authority; Pace; the Illinois Tollway; William Valicenti, 2010.