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Chapter 1

Introduction

Public transportation and affordable housing are natural complements. When combined, affordable housing near transit can reduce resident dwelling expenses while also reducing their transportation costs—a win-win for residents and an opportunity for more people to afford a higher quality of life. Moreover, transit-oriented development (TOD) can encourage more transit ridership, thus reducing congestion, lowering greenhouse gas emissions, and improving the financial performance of transit agencies. Identifying mechanisms to encourage TOD that incorporates affordable housing on site is a potentially valuable strategy to promote the fiscal and environmental health of communities across the United States.

Despite these complementarities, promoting affordable housing near public transportation remains a difficult matter; most new housing in the United States, and even most affordable housing, continues to be located far from effective transit options (Freemark 2023). Local zoning policies in the areas adjacent to stations sometimes fail to accommodate the construction of new apartment buildings, despite the manifest desire of people to live in areas close to public transportation (Schuetz et al. 2018). Moreover, investments in transit sometimes raise surrounding property values, making it more expensive for existing residents with low and moderate incomes to remain in place or move in (Zhong and Li 2016). And, often, new TOD projects fail to include provisions for affordable housing at all; instead, many new apartment buildings in such areas are entirely advertised to people who are capable of paying market rates (Ewing et al. 2022). Finally, the design of transit projects themselves often fails to account for either existing or potential future dwellings. These circumstances collectively present a barrier to encouraging additional affordable housing near transit.

In this guidebook, we trace a path forward. We expand the public knowledge about what we mean about TOD and affordable housing, explore best practices related to encouraging affordable housing in the TOD context, and identify outcomes that should be avoided. This guide offers a selection of innovative tools to better link transit and affordable housing, designed to assist transit agencies and also housing agencies at the local and state levels across the United States. We detail approaches that can support housing and transit agencies in not only ensuring that their projects benefit the communities they served through enhanced mobility, but also through expanded availability of homes that are accessible to people with low and moderate incomes. This work also includes recommendations for researchers and analysts wanting to contribute to the improvement of the interplay between affordable housing and transit.

1.1 Challenges and Opportunities

When it comes to coordinating planning for public transportation and affordable housing, with few exceptions, no single actor can completely set the agenda. The first problem is the disaggregated nature of decision-making over transportation policy. Transit agencies typically serve citywide or regional geographies and largely limit the scope of their scarce resources to operating buses, trains, and paratransit vehicles. Further, most metropolitan areas have more than one transit provider and while some coordinate on service planning, others do not. Other providers operate mobility options including micromobility, shared bicycles, and ferries, while cities own and operate the harbors and roadway network via which most that these vehicles travel. Each of these providers is seeking to address a specific market, which may or may not have much to do with providing access to, or incentives for, affordable housing.

At the same time, the second problem is that local and state governments typically make decisions related to land use and housing policy, often with little coordination with public transportation agencies or their services. These governments make choices about what types of construction densities are allowed where.

Zoning and related policies, like parking requirements, can play a big role in influencing where TOD is feasible. Local and state governments also choose how to distribute affordable housing funds, such as through the federal Low Income Housing Tax Credit (LIHTC) program that supports the construction of new developments, or through subsidies like Housing Choice Vouchers to individuals to rent units in private market buildings. Policymakers only occasionally require that these programs incorporate transit access into decision making about what funds go where.

The fragmentation of authority over decision-making related to transit, land use policy, and affordable housing is made more complicated by broad variation in approaches to both TOD and affordable housing. There is no standard definition for TOD and what may be referred to as transit-*oriented* may simply be transit-*adjacent*, meaning it is not necessarily designed in a way that encourages residents to use transit (Renne 2009). TOD has been usually described in the context of rail stations, but since most transit agencies in the United States only operate buses, it is essential to emphasize that TOD can also be implemented in areas around bus rapid transit (BRT) lines—and that standard bus services can play an essential role in expanding access to existing affordable housing through routing changes. Transit agencies may be able to collaborate with local and state governments to encourage and support development that benefits from its closeness to stations, but ultimately fail to ensure that new development—or the transit that serves it—reduces the demand for driving, lowers greenhouse gas emissions, and builds at higher densities than would otherwise occur without the proximity to transit. Thus, getting TOD right is of key importance in maximizing the benefit of coordinating transportation and housing to support better outcomes for all.

Relatedly, while affordable TOD is an understandable goal, there is no single definition of affordable housing. The majority of renters with low and moderate incomes do not live in government-subsidized units, but rather in "naturally occurring affordable housing" typically owned by private-sector landlords, and sometimes protected through programs such as rent stabilization (Decker 2021). This means that assessing the state of housing affordability requires thinking beyond what units of governmental entities have supported directly through grants. Moreover, access to public transportation can play a vital role in influencing housing affordability; people living in exurban neighborhoods or who are reliant on cars, for example, spend more money on transportation, taking away from their potential budget to spend on housing (Freemark 2022; Hamidi et al. 2016). As such, there is an imperative to consider both transportation and housing costs simultaneously when assessing housing affordability.

The good news is that transit agencies and their governmental partners are increasingly recognizing their roles in accommodating and expanding affordable housing near transit. In some ways, they are following the path of rail transit systems completed in the early part of the 20th century, often constructed in parallel with new land development (Plunz 2016). Though that approach was largely lost in the postwar period, when transit was primarily understood to be a mechanism to relieve automobile congestion (Schrag 2014), new models for TOD are cropping up all over the nation. Several key models include:

- In the Seattle region, Sound Transit has established a dedicated fund to support affordable housing in TOD near its new light rail stations. The agency is planning to sell land left over from its construction projects to non-profit affordable housing developers to invest in new units affordable to households making 80 percent of area median income or below (Sound Transit 2023).
- The federal government has established new sources of financing for TOD through its Railroad Rehabilitation & Improvement Financing (RRIF) and Transportation Infrastructure Finance and Innovation Act (TIFIA) programs, and the government recently announced it had signed a loan for its first housing project. These sources of funds could be useful for affordable housing developers looking to reduce debt costs for projects located near transit stations around the country (Build American Bureau 2023). These low-costs loans could be combined with the federal government's new allowances for transit agencies to provide surplus land for free to affordable housing developers.

- In 2018, California passed a law allowing Bay Area Rapid Transit to require municipalities the agency serves to zone for new housing construction at the minimum density levels that the agency has established. This could result in thousands of additional housing units near stations (Bay Area Rapid Transit 2023).
- Recently, the city of Chicago established guidelines for the implementation of "equitable TOD," which the city defines as projects that support dwelling units for people across a band of income ranges. The city's policy plan is being used by the local housing agency to determine how to assign LIHTC funds to affordable housing projects located in the areas just adjacent to stations (City of Chicago 2023).

These and other examples are notable demonstrations of the progress US transit agencies and governments are making to advance affordable TOD. This research is designed to meet the challenge of providing practical guidance to assist transit agencies and affordable housing stakeholders to broaden these efforts.

1.2 Research Methods

Public transportation offers an excellent opportunity to expand access to people across a range of incomes and backgrounds, especially if combined with affordable housing availability. But getting that combination right requires detailed background in this subject matter and examples from around the nation that show best practices. Therefore, this work featured two distinct phases of research to inform this guidebook.

The first constituted an extensive review of the literature related to the links between affordable housing access and public transportation. This entailed the review of over 100 resources—including scholarly articles, white papers, industry reports, program and project evaluations, presentations, and interview transcripts. The second integrated in-depth analysis of 10 case studies, integrating takeaways from interviews of program administrators to derive actionable tools for stakeholders. Figure I-1 outlines this two-pronged approach.

The following questions served as a framework against which we mapped both phases of the research:

1) **What do we mean by affordable housing and TOD?**
   - Investigate what scholars and public stakeholders have described as the meanings of affordable housing and TOD, and how or why those meanings took form.
   - Specify what is known about how to think about housing affordability in the context of residents' ability to have a high quality of life without having to own a car.

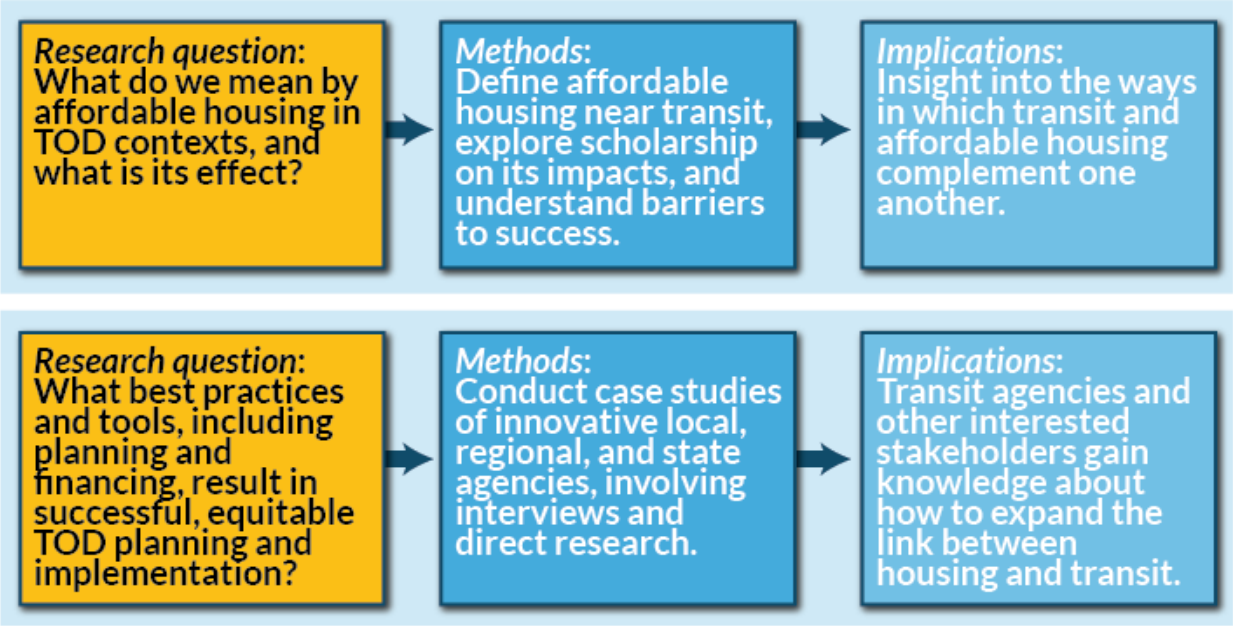
2) **How does access to housing—particularly affordable housing—influence transit demand?**
   - Explore what the evidence shows about the relationships between affordable housing and both transit access and transit-specific travel behavior.
   - Seek to understand what sorts of affordable housing—e.g., subsidized or not, designed for residents with different ranges of income, etc.—have different impacts on transit ridership.

3) **What are the barriers to successful TOD? Barriers to TOD with high shares of affordability?**
   - Identify the cultural, societal, and financial barriers to successful TOD that integrates a high level of affordable housing.
   - Note what circumstances are likely to produce gentrification and displacement effects that may undermine the benefits of such TOD.

4) **What best practices and tools are available to add affordable housing near transit and mitigate potential displacement?**

- Learn from case studies of transit agencies and related stakeholders that have successfully synergized transit and affordable housing investments.
- Provide explanations for what funding, financing, and planning tools have been most useful in achieving positive outcomes.

Figure I-1. Overview of two-pronged research approach



This process concluded in the practitioner's guide presented here that provides innovative tools designed for realistic and pragmatic use by public transportation agencies, housing agencies, and researchers to achieve better links between affordable housing and transit, facilitating improved quality of life for those with lower incomes as well as improved conditions of social equity for all.

1.3 Outline of This Guide

We begin in Chapter 2 with a background discussion on TOD and affordable housing. We provide a detailed discussion of the history of those terms and describe what other scholarship has to say on the benefits of their coordinated planning. This examination provides practitioners with the evidence necessary to explain why affordable TOD has positive benefits for communities, while also pointing to some of the potential concerns related to gentrification that may result from some instances of TOD.

In Chapter 3, we review the 10 case studies from around the nation of transit agencies that have collaborated with local and state governmental officials to advance affordable TOD. These lessons provide actionable ideas that may be relevant for others working throughout the country.

In Chapter 4, we offer action plans for public policymakers working in this space. We provide separate action plans for transit agencies and local governments, which are most directly involved in issues related to affordable housing. We also suggest recommendations for future research to understand the links between TOD and affordable housing.

In Chapter 5, we offer a set of resources that practitioners can leverage to accomplish the goal of increased affordable TOD in their communities. And in the appendices of the report, we provide further details sourced from our literature review and our case studies.

Chapter 2

Background on Transit-Oriented Development and Affordable Housing

Public transportation offers a myriad of benefits to both its riders and to those living in areas served by transit who do not themselves use transit services. These benefits are maximized in the context of transit-oriented development (TOD), which focuses a dense mix of uses in walkable areas close to frequent, fast, and reliable transit, especially when TOD includes a plethora of affordable housing. In this chapter, we review the existing scholarship related to each of these areas of interest.

2.1 Benefits of Public Transportation

2.1.1 Benefits to Riders

Public transportation offers an affordable way for people to get around. For those with low incomes—and for many others who cannot or do not want to drive or cycle—bus, ferry, shuttle, and train options are an essential link to school, work, social circles, recreation, and more. Compared to car use and its associated costs of fuel, maintenance, parking, and tolls, riding transit is less expensive out of pocket for most travelers (Young 2015). Beyond cost saving, transit can offer riders an enjoyable travel experience. When given its own right-of-way and operated reliably, transit is an alternative to being stuck in traffic and suffering the negative mood effects that driving in congested conditions has been found to render (Morris and Hirsh 2016).

There are safety benefits to transit use. With the exception of airplanes, transit is the safest vehicular travel mode per capita with respect to both injuries and fatalities (Bureau of Transportation Statistics 2022). Riding transit is also associated with a number of physical health and wellbeing benefits. Many studies have explored the relationship between different travel modes and total daily physical activity, a metric linked to improved health outcomes related to obesity, heart disease, hypertension, and cancer, plus lower health-related costs (Sener et al. 2014; World Health Organization 2024). One King County, Washington study found that on average, transit users—in walking to and from stops and within stations—engage in 14.6 minutes more of daily physical activity strictly related to transportation than car users (Saelens et al. 2014). Access to public transportation is also associated with greater social participation and decreased feelings of isolation among older adults (Lamanna et al. 2020).

Though not discussed as frequently, transit also has the potential to incite growth in empathy. For many, moments in transit are some of the few, regularly occurring times in which we break from our homophilic social tendencies and coexist with others who are significantly different from ourselves. In addition to sharing the physical space of transit, riders share the experience of transit. Psychologists show that both shared positive and dysphoric experiences—like delayed trains and excessively overcrowded buses, for example—produce identity fusion: a visceral sense of oneness (Whitehouse et al. 2017). In this sense, transit may well be a contributing detriment to social wellbeing (Rennert 2021).

2.1.2 Benefits to Residents of Transit-served Areas, For Riders and Non-Riders

Many of transit's benefits are spatial in nature. In that sense, they exist for those living and working near transit services, irrespective of an individual's mode choice. For example, living in an area well-served by transit may subject residents to lower levels of pollution and better air quality than living in transit-poor areas (Beaudoin et al 2015). Well-patroned transit networks can significantly contribute to reduced congestion for metropolitan areas, resulting in shortened trip times for roadway users of all modes (Anderson 2014).

Additionally, living in built environments designed around transit services reduces resident exposure to crashes (Litman 2016). As exposure to motor vehicle crashes is linked to negative psychological and emotional impacts (Craig et al. 2016), this supports the argument that transit services promote public health benefits not only for riders but for non-riders as well. Moreover, through land-value uplift, being located proximately to certain transit infrastructure like rail stations can raise property values (Rennert 2022). This speaks to transit's ability to expand wealth accumulation. Finally, there are potential economic advantages of investment in transit for communities, including job creation and local business development facilitation (APTA 2020).

2.2 Transit-Oriented Development

2.2.1 Defining Transit-oriented Development

Transit-oriented development (TOD) is the combination of high densities (more people and uses in specific area), diversity (a mix of uses, from residential and commercial to institutional and green space), and design (neighborhoods designed to be walkable), applied to neighborhoods or projects located near effective public transportation services (Cervero and Kockelman 1997). TOD has become a major tool in the planning profession in the United States and could be a key approach to generating affordable housing near public transportation as well as increasing transit ridership.

Being adjacent to transit service means access to destinations for residents, visitors, and workers via an affordable mode of transportation. But transit adjacency does not have a single meaning. First, distance varies: development near transit can be directly connected to stations, within a five-minute walk, or further afield. Second, transit quality differs: transit can offer a range of options, from all-day, frequent rail service to infrequent, unreliable bus routes. Finally, urban design and surrounding land uses diverge: the neighborhoods near transit—and transit stations themselves—span the gamut when it comes to how comfortable they are in terms of supporting people walking and biking to and from stations, let alone being able to take advantage of public services and other resources in the surrounding area.

To help differentiate the fact of being transit-adjacent from being truly transit-*oriented*, scholars and practitioners developed the TOD concept in the 1980s (Calthorpe 1993; Thomas and Bertolini 2017). Calthorpe (1993) defines TOD density as achieving 25 to 62 housing units per hectare (10 to 25 housing units per acre). Others add mobility-related elements, including higher levels of destination accessibility, an inviting streetscape and walking/rolling environment, lower distances to transit stops, and policies that manage travel demand to limit car use (Jamme et al. 2019). This combination of factors, the argument goes, encourages people to take transit rather than drive. TODs thus can help encourage environmental sustainability and create communities with lower costs of living, by enabling people to accomplish most tasks without driving (Belzer and Autler 2002). Successful TODs can also result in a higher density of uses since they do not need to incorporate as much parking.

A whole line of scholarship has attempted to parse out the difference between transit adjacency and transit-oriented development. Using measures of density, diversity, and design, Renne and Ewing (2013) find that a large share of neighborhoods adjacent to transit do not meet TOD goals, especially those related to mode split and discouraged vehicular travel. Belzer and Autler (2002) point to a combination of pedestrian infrastructure, high densities, savings for travelers, livability, higher financial returns, a diversity of housing types, and efficient land-use patterns as key to achieving the most effective TOD outcomes.

There has been some disagreement about how close a development project has to be to a transit station to classify as TOD. Scholars have argued for various distances, from a block or less (Ewing et al. 2015; Keniewska et al. 2024) to 2,000 feet (Calthorpe 1993) to a half mile (Bernick and Cervero 1997; Dittmar and Ohland 2003; Fogarty and Austin 2011; Nasri and Zhange 2014; Sourourian 2010). Some emphasize that different types of TOD are feasible at different distances to transit.

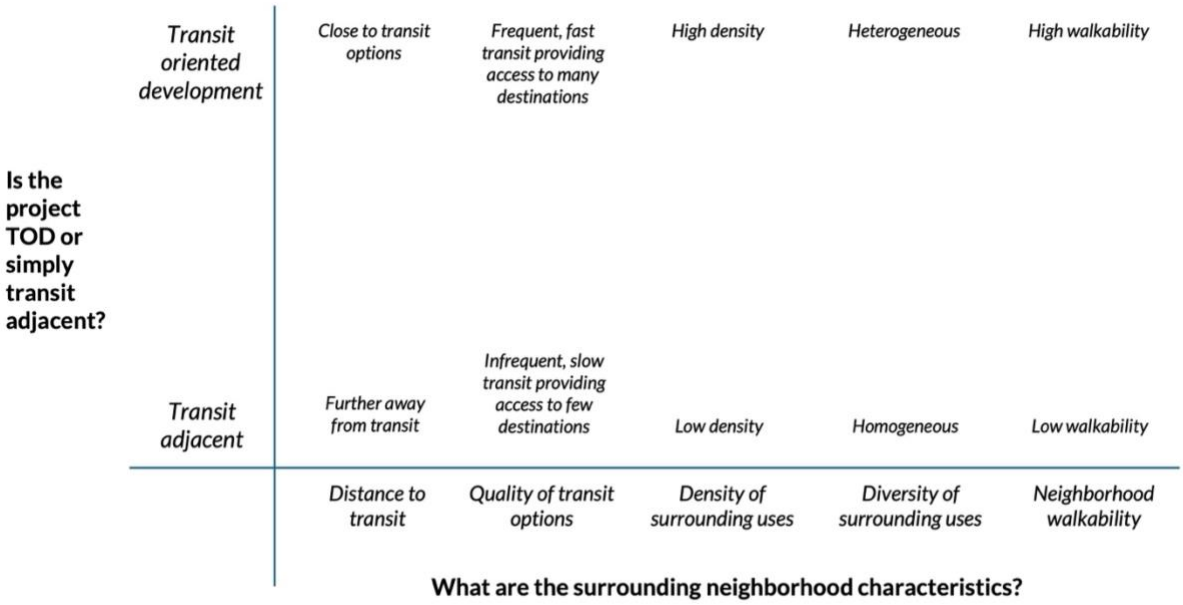
Both existing and new neighborhoods can be classified as TODs. Classic streetcar suburbs of the early 20th century, which incorporated commercial development and relatively high-density apartments, helped serve as a model for the TOD concept. But the TOD model differed from the standard development practice

of the late 1980s and early 1990s (as well as today's). While most newly built neighborhoods were principally comprised of low-density single-family homes isolated from other uses, and where walking was either useless to fulfill day-to-day needs or impossible given a lack of sidewalks, TODs feature a dense combination of building types and uses and excellent pedestrian facilities around stations. TODs are both nodes of a metropolitan area and vibrant, appealing neighborhoods (Bertolini and Spit 2005). Ultimately, TODs are not only car-light but provide the opportunity to re-center the metropolitan area away from requiring people to move around by cars (Bertolini et al. 2012; Ewing and Cervero 2001).

Walkable urban design is a key element of the TOD concept. TODs, proponents suggest, should feature a grid of streets surrounding small blocks (Arrington and Cervero 2008; Calthope 1993; Lund et al. 2004). This grid should be designed for walkers' and rollers' comfort, first and foremost, and ensure that getting to the transit station itself is a pleasant experience. One key opportunity is to coordinate the location of retail between homes and stations, to support rail-pedestrian trip chaining (Hickman and Hall 2008).

Figure II-1 illustrates key elements of successful TOD, as compared to simply transit-adjacent development.

Figure 2-1. Key elements of successful TOD



Source: The authors, based on a review of the scholarship.

TOD can be implemented in a variety of ways. One approach is the prototypical New Urbanist private investment: New neighborhoods in suburban areas. These communities include substantial parking and extensive street space for cars, but they also incorporate features designed to promote walking, such as town centers that ensure that retail shops and restaurants face the sidewalk rather than parking lots. While they are principally comprised of single-family homes, these also sometimes include apartments in the center. Ultimately, these types of suburban areas could incorporate elements of the core city, but in a more desirable and less congested manner (Ibraeva et al. 2020).

Private investors also support TOD through infill construction in urban neighborhoods. These projects prioritize increasing residential densities around transit stations and often include elements such as retail on the first floor of apartment buildings. To enable these types of projects, local governments often institute mixed-use zoning policies that encourage density and diversity. In some cases, transit agencies work with private investors to conduct "joint development" encompassing projects adjacent to, or sometimes directly on top of, stations.

2.2.2 Modal Conditions of TOD: Both Rail and Bus Services

Most of the research about TODs since the 1980s has focused on access to rail transit. (Some scholars, such as Bertolini et al. [2012], simply define TOD as only occurring near rail stations.) This may be a result of the temporal confluence of the growth of scholarship related to TODs and the increasing construction of light rail and streetcar lines in U.S. cities during that period. It may also reflect the widespread perception—often not grounded in reality—that rail transit always provides a better quality of service than bus options. Finally, it may be a consequence of a view that since rail transit projects are so expensive to implement, their cost effectiveness should be increased by ensuring an adequate source of ridership near stations, which can be better accomplished by promoting TOD in the areas nearby.

Over the past two decades, however, there has been increasing interest among urban transportation scholars and local governments in improving bus service. Inspired by cities like Curitiba, Brazil, whose bus rapid transit (BRT) system moves hundreds of thousands of riders daily rapidly and reliability, some U.S. localities and transit systems have concentrated resources on improving bus quality through bus-priority infrastructure projects, such as bus lanes and traffic signals that adjust to ensure that buses move through intersections before other modes of transportation (Vanasse Hangen Brustlin, Inc. 2011). In theory, better bus service could be associated with TOD.

Key to making bus-based TOD effective is frequent service operating along high-quality infrastructure (Currie 2006). In other words, a regular bus route operating to traditional bus shelters (or even just bus poles) is unlikely to generate much interest from private investors that are considering developing new projects in the surrounding areas. Moreover, implementing improved bus service in a way that avoids exposing the surroundings to high levels of noise and particulate pollution is needed to make areas near bus transit appealing. Electric bus service may resolve this issue at least to some degree.

Despite this growing enthusiasm for TOD around bus networks, some argue that bus-based TOD faces some fundamental obstacles. Because bus service is generally slower and often fails to provide regional connectivity, it may not be able to attract the concentrated investment that rail systems have generated (Cervero and Dai 2014). Moreover, Guo et al. (2023) argue that the nimbleness of bus service—the ability to move service around as demand changes—means that bus systems should respond to development, rather than be used as a mechanism to promote development.

2.2.3 Living Proximately to Transit and Travel Behavior

Prior to the Covid-19 pandemic, more than a third of TOD residents in the United States commuted by public transportation, a far higher rate than across the nation overall, to a substantial degree because access to transit is far superior in TODs than elsewhere (Renne and Ewing 2013). Moreover, neighborhood conditions play a major role in shaping mobility. There is a strong correlation between transit ridership and community job and population densities, with higher employment densities most strongly associated with more riders (Cervero and Guerra 2011). One hundred additional jobs within a quarter mile of a station, Guerra and Cervero (2013) find, are associated with 69 additional weekday transit rides, whereas 100 additional residents in the same area are associated with 34 additional rides.

In table II-1, we summarize major conclusions from scholarship measuring the link between transit adjacency and travel patterns. Researchers largely agree that residents living near transit stations (typically defined as rail transit stations), both in TODs and elsewhere, drive less than those living elsewhere (Arrington and Cervero 2008; Boarnet et al. 2017; Ewing et al. 2022; Tal et al. 2013; Zamir et al. 2014) and take transit more (Ibraeva et al. 2020). Transit use is higher during periods when there is a growing economy (Cervero et al. 2004), in neighborhoods with higher densities (Ewing et al. 2015), where there is better walkability (Ibraeva et al. 2020; Renne and Ewing 2013), and when there is limited parking available at trip origins and destinations (Chatman 2013). In one particularly interesting study that compares travel behavior before and after the opening of the Expo light rail line in Los Angeles, Spears et al. (2017) show that residents substantially reduced their car use and took public transportation more due to the transit investment.

Table 2-1. Ease of transit access is associated with more transit ridership, especially in dense neighborhoods

Study	*Geography and period*	*Method*	*Finding*
Synthesis finding 1: Transit access is associated with higher transit use and less car use, especially in walkable, dense neighborhoods			
Arrington and Cervero 2008	17 TOD projects in four metropolitan areas across the United States	Measured actual motor vehicle use at projects.	TOD residents take substantially fewer car trips, compared to the ITE manual, with 44 percent lower trip rates. This is especially true in denser neighborhoods closer to regional centers. Even so, parking is designed for most TOD as if it were the same as elsewhere.
Boarnet et al. 2017	Southern California, 2013	Compares household travel for residents within and outside station areas.	Residents within a half mile of transit have lower VMT than elsewhere. High-income households reduce their VMT by a greater amount (but they start out higher); those with lower incomes increase their transit ridership to a greater degree.
Cervero et al. 2004	United States, recent decades	Review of evidence from previous studies.	TOD is associated with higher transit ridership, but especially during economic upticks, when traffic congestion increases, and when there is economic and population growth in an area. Self-selection is a major explanation for outcomes.
Chatman 2013	Northern New Jersey, within two miles of rail stations, 2009	Household survey of housing, parking, and travel patterns.	Automobile ownership and travel were much lower among households in new buildings near rail stations, but the best explanation is household tenure, density, and parking availability. Parking, both at origin and at destination, is the key attribute explaining transit use.
Ewing et al. 2015	United States, regions with household travel surveys, 2000-2012	Pooling of travel and built environment data from a number of regional travel surveys.	VMT declines in contexts where transit stops are within a quarter mile. Auto trip frequency also declines within increasing densities of transit stops within a half mile.
Ewing et al. 2022	Five TODs across the United States	Compare trips and parking in TOD using manual surveys with ITE baseline.	Finds that case-study TODs have substantially less driving and parking than conventional projects. Peak parking demand is one half that in the ITE. Car mode shares are low.
Ibraeva et al. 2020	Global	Review of scholarship around the world related to TOD.	Residents near transit generally commute more by transit than others, but this is more true when the neighborhood is a TOD, meaning dense and walkable. TOD also is associated with lower car travel.
Renne and Ewing 2013	Neighborhoods near transit across the United States	Compares neighborhood characteristics with transit commuting.	Finds that TOD, as compared to hybrid or TAD areas, is likely to result in 3.5x higher levels of transit, walking, and biking use, plus half the level of car ownership. Notes that a doubling of activity density is associated with a 15 percent higher transit use; a higher jobs-to-residential ratio also increases transit use.
Spears et al. 2017	Neighborhoods around Expo Light Rail Line in Los Angeles, 2011–12	Survey of residents before and after line implementation	Residents near line had similar travel patterns before line opened; 18 months after, those within a kilometer of stations drove 9.75 miles less per day and took 0.21 more rail trips per household.
Tal et al. 2013	Variety of locations, 1985–2001	Comparison between a variety of studies.	Finds that moving a mile closer to a transit station reduces daily VMT by 1.3 to 5.8 percent; effect is more pronounced further away.
Zamir et al. 2014	TOD dwellers in Baltimore and Washington, D.C., 2007–08	Models based on local household survey data.	TOD dwellers had fewer car trips and shorter travel distances for all modes, after controlling for demographics. TODs in Washington were more effective on these counts than those in Baltimore.
Contrasting finding 1: New residents near transit do not use transit at higher rates, and car ownership may increase due to resident composition			

Study	*Geography and period*	*Method*	*Finding*
Cao and Schoner 2014	People in neighborhoods around Hiawatha light rail in Minneapolis, 2011	Compares with two comparable corridors as controls. Surveys individual households selected from dataset of movers, using propensity score matching to compare people's travel.	New residents near light rail use transit as much as new residents elsewhere in the city. But residents who lived there before use transit at higher rates (about 2 more trips a month). Trip increases by transit for going to a store, restaurants, and entertainment, and for both non-work and commute trips.
Kwoka et al. 2015	Residents in the Denver metropolitan area, 2009	Survey of travel behaviors, comparing drivers versus non drivers.	Find that living near a transit station does not in itself increase transit use, but if their workplace is near transit, they are less likely to drive. These people are less likely to drive on other trips, as well. Does not control for personal characteristics.
Pollack et al. 2010	Neighborhoods served by new rail transit stations throughout the US, 1990–2000	Comparison of neighborhood demographics over time.	Public transit use increased in station areas more quickly than in the surrounding region in 57 percent of station areas. At the same time, however, car ownership rates increased more quickly in 71 percent of station areas.

A minority of researchers argue that the link between transit use and transit access is not as strong as others have suggested. In examining Minneapolis, Cao and Schoner (2014) find that, when people move into a neighborhood near light rail, they are likely to ride transit just as much as residents who move into neighborhoods where only bus service is available. And Kwoka et al. (2015) find that the positive association between living near transit and using transit more only applies if peoples' workplaces are also located near transit. Finally, though Pollack et al. (2010) find that transit use is higher near stations, they also find that car ownership grows more quickly in those areas, likely because of the higher incomes of those neighborhoods' residents.

What is clear is that higher densities result in more cost-effective transit investments and service. Though capital costs for transit projects rise with population density, the additional riders generated by serving more populous areas more than make up for those added expenses (Guerra and Cervero 2011). Cervero and Guerra (2011) argue that cost-effective light rail investments require about 30 people per gross acre around stations, and cost-effective heavy rail projects require about 45.

It is worth emphasizing that the predominant determinant of travel patterns in the U.S. is not the built environment or the availability of transportation services—it is the income of travelers. Pre-pandemic, wealthier people were likely to take more and longer trips overall, compared to others living in similar communities (Ewing and Cervero 2001; Martin et al. 2016). (These conditions may have changed as a growing share of people with white-collar jobs has switched to working from home.)

Moreover, as mentioned, there is some self-selection bias inherent in examining the travel patterns of people based on their residential locations. People who want to live in areas near transit are more likely to choose neighborhoods with that option, unsurprisingly (Langlois et al. 2015). Even so, some researchers have demonstrated that the effect of transit access on transit use remains even after controlling for that reality, such as by comparing travel patterns before and after the opening of a new rail line (Spears et al. 2017). Even after controlling for residential self-selection, built environment conditions explains a large share of individuals' travel patterns (Cao 2009; Cao et al. 2009), especially those of younger people and renters (Humphreys and Ahern 2019).

Finally, it is worth asking whether the Covid-19 pandemic has altered conditions for transit agencies. If a greater share of people now works from home, do office locations matter as much in terms of ridership? As of this writing, the share of employees working from the office is slowly increasing, so making any long-term conclusions from data related to working from home may not be a good idea. Nonetheless, this issue deserves further analysis.

2.3 Better Connecting Transit and Affordable Housing: Equitable TOD

Responding to the need to address high costs of living and encourage travel using modes of transportation that produce fewer carbon emissions, policymakers at various governmental levels in the United States have increasingly come to see linking housing and transportation planning as a priority. The federal government, for example, has in some cases incorporated location accessibility through public transportation as a key metric in evaluating the location of affordable housing (Haas et al. 2016). Several states have integrated transit access into their decision-making related to what projects to award affordable housing funds. Moreover, some localities have adjusted their zoning policies to encourage higher densities in areas adjacent to stations.

Even so, U.S. metropolitan areas face what Kramer (2018) refers to as a paradox of access. In cities like Boston and New York, affordable transportation options that serve much of the region are available, but many of the neighborhoods located near stations are too expensive for moderate and low-income families to afford. Certain housing units are affordable, but these are often located in automobile-dependent suburban areas without transit access. These dueling conditions make affordable living difficult for many families. And the situation has arguably worsened due to a combination of inadequate availability of high-quality transit service, the fact that it is difficult to serve auto-centric communities with effective public transportation, and limited housing construction in areas near transit stations. This situation sometimes results in increased competition for the homes that are available near stations, inflating real estate prices, as described below.

Over the past several decades, U.S. cities have become increasingly adept at concentrating homes in a manner that is likely to encourage less driving and more transit use. The share of new housing units added in very-low-population density areas declined substantially in the 2010s compared to previous decade, and the share of additional units located within two kilometers (about 1.25 miles) of rail or BRT stations increased from only about 6 percent nationwide in the 1970s to 20 percent in the 2010s (Freemark 2023). In examining housing stock growth, Freemark (2024) finds that in the 1960s through 1980s, neighborhoods adjacent to new rail or BRT stations added homes at a slower pace than those with no transit access. This trend reversed in the 1990s and beyond, such that transit-adjacent neighborhoods are now growing more quickly. But what does this evolution in development trends translate into with respect to transit access for those living in affordable housing? We carry out this discussion below.

2.3.1 Defining Affordable Housing

There is no consistent scholarly delineation of affordable housing. But the most common definition used is that housing is affordable if it costs a family or household less than 30 percent of their gross income before taxes. This definition is used by the U.S. Department of Housing and Urban Development (HUD) for its rental programs (HUD 2014). Families living in federally supported public housing—publicly owned and maintained units—are expected to pay no more than 30 percent of their monthly incomes to rent every month. Similarly, lenders generally restrict the size of mortgages to a level that assumes that households should pay no more than 28 percent of their income on housing costs (Nerd Wallet 2024). HUD defines households that pay more than 30 percent of incomes for housing as *cost burdened*, and those that spend more than 50 percent as *severely cost burdened* (McCabe 2017).

Housing affordability as it is typically defined, then, is a function of household income: Families with higher salaries can "afford" a more expensive home. This is, admittedly, an arbitrary rule; 30 percent of the income of a person with a low-paid job may be large enough that it prevents them from being able to afford enough food to eat—whereas 30 percent of the income of a highly paid individual could have little impact on their overall quality of life.

Housing affordability is often conceptualized within the scope of incomes across metropolitan areas. In defining income limits to qualify for a variety of its programs, HUD compares household incomes—once adjusted for household size—with the median income in each metropolitan area (this is known as the area

median income, or AMI). HUD defines households at or below 30 percent of AMI as extremely low income; between 30 and 50 percent of AMI as very low income; between 50 and 80 percent of AMI as low income; and between 80 and 95 percent of AMI as moderate income (Teles et al. 2023). A housing unit dedicated to households at 50 percent of AMI in a region with a median income of $100,000 could thus charge a monthly rent of $1,250, assuming the 30 percent income threshold mentioned above.

While housing costs constitute the largest share of expenditures for most families in the United States, transportation costs also make up a large amount of the average family's income. In 2022, for example, the average U.S. family spent 33.3 percent of expenditures on housing and 16.8 percent on transportation (Bureau of Labor Statistics 2023). Thus, transportation and housing expenditures add up to roughly 50 percent of overall income. The Center for Neighborhood Technology has defined this concept as the Housing + Transportation index; the organization proposes that families should not spend more than 45 percent of income on the two expenditures combined. That said, transportation costs vary tremendously based on household car ownership and car use. Families with no car—depending on their incomes—spend one-fourth to two-thirds as much on transportation costs as those with cars (Freemark 2022). A family seeking to keep housing and transportation costs in check might be able to spend more on housing if they do not need car access; the opposite would be true for a family that needs or wants to have a car around.

Some scholars argue that the definition of housing affordability should be adjusted to take into account transportation costs (Coulombel 2017). This would enable, for example, families with no car to qualify for a larger mortgage, giving them greater housing choice. This would also, Coulombel (2018) notes, encourage families to choose dwelling locations that are more "location efficient," meaning their residence could be located in places with lower transportation costs. Indeed, while housing costs in metropolitan areas like New York are much higher than those in regions like Houston, once having accounted for the fact that public transportation systems are much more accessible in the former regions, households' overall housing plus transportation expenditures are actually lower in the New York region (Guerra and Kirschen 2016).

Finally, affordable housing can be defined not just in terms of whether it is affordable as a share of a household's income, but also in terms of whether it is supported by governmental subsidies. HUD subsidizes millions of housing units throughout the country through the public housing and project-based Section 8 programs, as well as millions of families through the Housing Choice Voucher program; these units and vouchers are designed for families with very low or extremely low incomes. HUD also supports emergency housing shelters for people and families experiencing homelessness. The U.S. Department of the Treasury allocates Low Income Housing Tax Credits (LIHTC) to states and cities to distribute to developers to build or renovate housing units that are affordable to families with low incomes. A substantial share of LIHTC projects is built with additional subsidies that provide a higher level of affordability, such as by including project-based Section 8 subsidies or additional funding from HUD through the HOME program (Scally et al. 2018). Many states and cities have their own housing funds that subsidize housing, while some rely on the private sector to provide subsidized housing through inclusionary zoning programs that mandate a certain share of units be dedicated to low- or moderate- income families as part of new development projects (Spauster et al. 2021).

These public programs do not always account for variations between different parts of metropolitan areas in terms of housing costs; moreover, transportation costs are virtually never accounted for (Bieri and Dawkins 2016). That said, HUD does allow local agencies to adjust rental assistance based on local-area rents, enabling them to support families who want to live in more or less expensive neighborhoods (Center on Budget and Policy Priorities 2018).

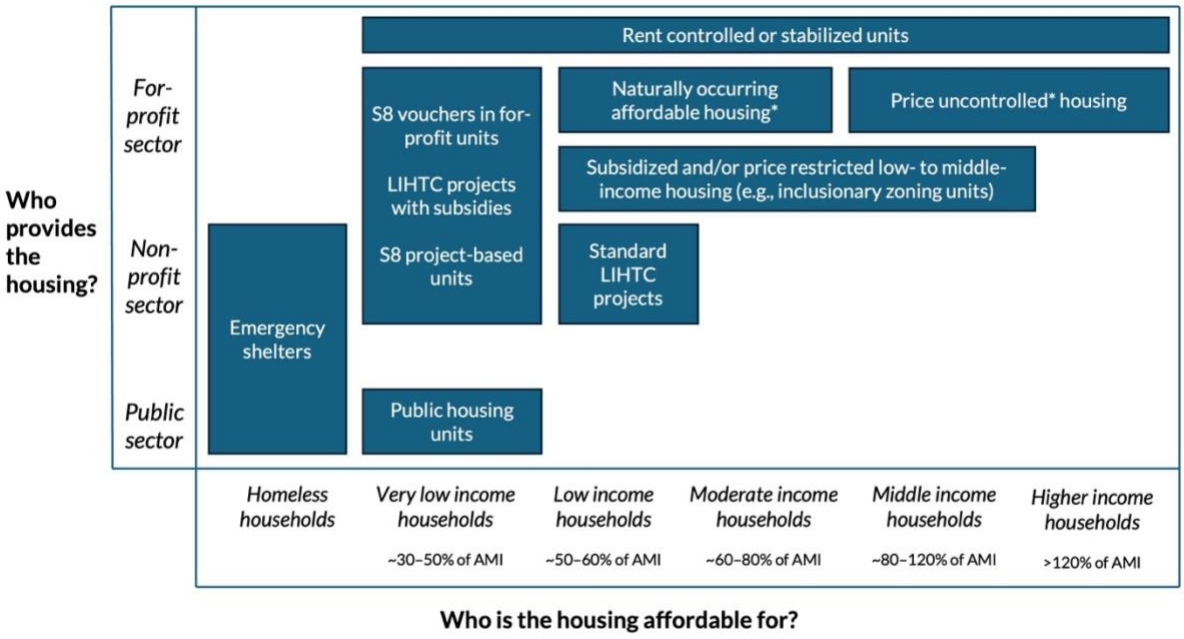
Publicly subsidized affordable housing can be contrasted with what is sometimes referred to as "naturally occurring" affordable housing, or NOAH, which is not publicly subsidized, but which nonetheless is affordable to families with low or moderate incomes due to the low rent levels charged by their private landlords (Weicher et al. 2017). NOAH units rarely include strict limits on family incomes (meaning, unlike HUD-subsidized units, families with higher incomes are allowed to live in them). But they constitute an

important share of the overall affordable housing market in the United States, including near transit, as described in sections below.

There is also a small share of housing units in some U.S. cities whose rents are stabilized by government rent control boards. These units rarely include housing income requirements—meaning they can be inhabited by families with a wide variety of incomes. But they do offer a major source of housing affordability on the private real-estate market in some large cities like New York and Washington, DC (Rajasekaran et al. 2019).

Figure II-2 provides a simplified summary of affordable housing in the United States, though circumstances vary between metropolitan areas and even between neighborhoods. On the X axis, this figure notes for whom such units are affordable, divided by income range. On the Y axis, this figure details who provides the housing. Note that, for middle and higher income households, the private market often provides housing that is affordable even without subsidies or price controls.

Figure 2-2. Housing that is affordable, in terms of limiting housing cost burdens



Source: The authors, based on a review of the scholarship.

Notes: AMI = area median income. LIHTC = Low Income Housing Tax Credits. S8 = Section 8 (also known as Housing Choice Vouchers). * Households that own these 'unsubsidized' units typically benefit from the mortgage interest tax deductions at the federal level and homestead exemptions at the local level, both of which are subsidies.

2.3.2 Prevalence of Affordable Housing Near Transit

On average, people who live close to transit—both within center cities and in suburban areas—are more likely to have lower incomes than people who live further away (Pathak et al. 2017; Pollack et al. 2010). This could mean either that people with limited incomes are attracted to the cost savings made possible by living near transit, and/or that housing in those areas is, on average, more affordable than elsewhere (though as we explore below, transit investments are also often associated with rising housing costs). Even so, in TODs—meaning walkable, dense, and mixed-use neighborhoods near transit—affordability remains limited. Examining 107 TODs in 24 metropolitan areas, Kaniewska et al. (2024) find that only about 24 percent of housing units are affordable for households earning from 50 to 80 percent of AMI, with the

majority of those not publicly subsidized. They also note that about half of the TODs they study have no affordable housing units at all, a finding shared by Ewing et al. (2022).

Evidence suggests that publicly subsidized affordable housing—units that receive support from HUD and other entities to keep rents low—is more likely to be located near transit than is housing overall. Housing units with federal subsidies and that are affordable to families with low incomes are more likely to be located near rail or BRT stations in the 10 largest U.S. metropolitan areas than are unsubsidized homes, though less than half of subsidized units are located within 500 meters of a station in all but the New York City region (Freemark 2023). Nationwide, about 15 percent of projects funded with LIHTC subsidies are located within a half mile of a rail station; the rate of LIHTC projects located in such areas have increased slowly over time both nationwide (Zuk and Carlton 2015) and in specific places, like New York City (Ellen and Welescouch 2015) and Orange County, California (Houston et al. 2013). HUD-subsidized housing, particularly that which is funded by the public housing program, is more likely to be located in walkable neighborhoods than are other homes across metropolitan areas (Koschinsky and Talen 2015).

Have transit investments been made specifically to serve affordable housing? Zuk and Carlton (2015) find that half of new rail transit stations have been added within a half mile of existing LIHTC projects, but they do not explore whether that choice was intentional or coincidental. Guo et al. (2023) develop an approach to altering bus routes to improve the transit accessibility of affordable housing, but, as far as the research team could identify, their approach has not been implemented.

2.3.3 Income Levels and Transit Use

Because of the affordable mobility their services provide, transit agencies throughout the United States carry passengers who have disproportionately lower incomes than the national average. In the Washington, DC region, for example, a majority of bus riders have low incomes—about ten times the share of total people with low incomes in the population overall (Washington Area Bus Transformation Project 2018). Similarly, a majority of riders on the Massachusetts Bay Transportation Authority, which serves the Greater Boston Area, have household incomes below the regional median; bus riders are especially likely to have low incomes (OPMI Data Blog 2024). Though transit plays an important role in serving residents of all sorts of backgrounds, these trends show that public transportation serves as an essential lifeline for people of limited financial means.

Understanding the travel patterns of people with low incomes is important from the perspective of affordable housing because those people who live in affordable housing are, by definition, more likely to have low or at least moderate incomes. Table II-2 documents scholarly findings related to differences in travel patterns between people with low incomes and others, based on their housing patterns.

Though the research on this subject is relatively sparse, the findings that do exist are in close alignment with one another. People with low incomes take fewer trips overall (Giuliano 2005; Howell et al. 2018). When they take trips, they are much less likely to use a car, to a large degree because their car ownership levels are much lower (Bardaka and Hersey 2019). When households own cars, in contrast, they are likely to take more trips (Blumenberg and Pierce 2012). Low-income residents are also more likely to travel by transit; in comparing residents near light rail stations in Denver, for example, Bardaka and Hersey (2019) find that transit mode shares among low-income people were more than three times as high as those of others with higher incomes in the same areas.

Table 2-2. Residents with low incomes take more transit trips and drive less

Study	*Geography and period*	*Method*	*Finding*
Synthesis finding 1: Low-income residents have fewer cars, are more likely to travel by transit, and generally take fewer trips			

Study	*Geography and period*	*Method*	*Finding*
Bardaka and Hersey 2019	Housing units along Denver light rail lines, 2017	Survey responses for properties along route.	Low-income residents were older and less likely to be working age; nonetheless, the transit trip taking of non-employed affordable housing residents was higher than that of employed market-rate ones. Low-income residents were much less likely to have cars (>50%, vs. <10% among market-rate units). For all trips, low-income residents were 66% transit, vs. 18% for market-rate.
Blumenberg and Pierce 2012	United States, 2009	Examines the National Household Travel Survey to explore relationship between income and car use.	Find that low-income people have fewer trips overall than people with high incomes, though they have many more walking and transit trips. Low-income individuals increase their mobility rapidly with additional income. Car ownership (especially moving from 0 to 1 car) results in higher travel for everyone, especially for low-income adults. [Limitation of the study is that it is examining only person-miles traveled, no other measure of accessibility.]
Chapple et al. 2017	Neighborhoods through Los Angeles and San Francisco metropolitan areas	Compares demographic change in tracts using a model of residential movement, combined with a travel survey.	Low-income residents near and far from transit travel by car at lower rates than high-income households. But low- and high-income residents reduce their driving by a greater degree when adjacent to rail (compared to middle-income residents), with high-income residents changing the most.
Giuliano 2005	United States, 1995	Review of Nationwide Personal Transportation Survey of 42,000 households.	Low-income adults are more likely to travel regularly by public transit, though it is worth emphasizing that most travel, even for them, is by private automobile. Low-income adults are also more likely to take no trips, or shorter trips.
Howell et al. 2018	California, 2010-2012	Uses household travel survey data to perform regression, adjusting for home locations and other local characteristics.	Households with lower incomes have substantially lower trip making. Those living in denser neighborhoods and in multi-family dwellings (not single-family homes) are particularly likely not to drive.
Synthesis finding 2: High-income residents may be particularly susceptible to shifting to biking and walking, not transit			
Danyluk and Ley 2007	Montréal, Toronto, and Vancouver, Canada, 1971–2001	Combination of ethnography and local data collection related to commuting patterns to work.	Higher-income residents in gentrifying areas often use non-car modes, but they often shift to biking instead of transit. They have the tendency to underuse public transportation compared to other users. This is true even after controlling for distance to city center.

There is some evidence that higher-income residents who move into gentrifying areas are more likely to shift out of cars and become walkers or bikers, rather than becoming transit riders (Danyluk and Ley 2007). Even so, there is limited evidence on this front and additional research is necessary to document it. That is particularly true because individuals may choose different modes for different types of trips (e.g., for work or for shopping) or at different times of day or year (e.g., based on the weather), and they may also choose to take more than one mode of transportation for a single trip.

Why does research indicate that people with low incomes are more likely to take transit and less likely to drive than higher-income individuals? One major explanation is that people with low incomes are less likely to own a car and afford the cost of gas, insurance, parking, tolls, maintenance, and other car-associated expenses. But there are also demographic explanations. People with low incomes—including those who live in subsidized housing—are more likely to be older and face health issues and disabilities, making it more difficult for them to drive themselves (Digenis-Bury et al. 2008; Gibler 2003).

As noted, affordable housing is more likely to be located near public transit than other sorts of housing units, suggesting a recognition of the different travel patterns of people with low incomes. Even so, transportation planners do not adequately take into account the differences in travel patterns between people by income when it comes to service modeling and demand estimation (Howell et al. 2018). This could have some substantial impacts. For example, the Institute for Transportation Engineers' handbook estimates that a 300-unit housing project would generate 2,000 average car-based trip ends per day. But evidence suggests that a building occupied by residents with low incomes would more realistically generate about 1,600 car trips and one occupied by residents with extremely low incomes would generate only about 1,000 (Howell et al. 2018). This suggests, similarly, that residents of affordable housing units are likely to have less need for parking than residents of market-rate housing.

2.4 The Rise of Equitable TOD

Living near transit offers accessibility benefits to residents, allowing them to cut down on their transportation expenses by reducing or even eliminating car travel. Transit access can complement affordable housing by lowering housing and transportation costs together. But because transit access has advantages for residents, it sometimes makes housing in the nearby areas more expensive. This may produce counterproductive outcomes, such as situations in which people with low incomes are less able to afford living in homes located near public transportation. This can have two major negative effects. First, it can encourage people with low incomes to move to lower-cost homes *further* from jobs and other daily needs, which would increase their transportation costs. Or it can require people with low incomes to pay a higher share of their income for housing to live in areas near affordable public transportation.

As commonly implemented, TODs have sometimes been associated with rising housing prices, gentrification, and even displacement (see Appendix A). Until recent years, with rare exceptions, initiators of the TOD concept rarely mentioned housing affordability as a key goal, focusing instead on travel behavior (Ibraeva et al. 2020). Over the past decade, however, community stakeholders and policymakers throughout the United States have pivoted, placing new emphasis on the concept of "equitable TOD" (eTOD). This development approach has the goal of ensuring that people of all backgrounds can live in areas near transit, and does more than standard TOD to prioritize providing better transit options for those more likely to be transit users (Bardaka and Hersey 2019).

Achieving the promise of eTOD involves resident engagement in the planning process (Pollack et al. 2010). ETOD incorporates affordable housing and preservation, often in higher shares than is the minimum required by development ordinances, with the assumption that those sorts of investments can help prevent gentrification, or at least allow communities to avoid displacement (Zimmerman et al. 2022). Ultimately, eTOD, when inclusive of deeply affordable housing (i.e., housing affordable for families making 30 percent or less of area median income) can guarantee that people of all incomes have access to transit.

Thus far, eTOD remains nascent in most parts of the United States. But a select number of cities, such as Baltimore and Chicago, have incorporated the concept into their planning processes and zoning codes. Some localities have chosen to require a minimum percentage of affordable housing in new private-market projects near transit. Others have concentrated their investments in affordable housing in areas near transit stations, and a small number of transit agencies have made eTOD a cornerstone of their policy related to development in areas surrounding stations. Despite this increase in operationalization of the eTOD concept, there remain significant challenges to more widespread proliferation of this approach to directly connecting residents of affordability housing with transit services.

Before discussing those challenges, it is worth stressing that eTOD is not the only way that transportation decision-makers could prioritize connecting residents of affordable housing to quality transit services. eTOD focuses on bringing low-income residents to transit. Through the deployment of comparatively flexible modes, such as frequent, high-quality bus service or even microtransit, public transportation options can relocate to meet these residents where they are, such as areas with concentrated affordable housing. Agencies could further prioritize designing that service so that it feeds into their larger networks in a way

that facilitates the shortest trip times and/or fewest transfers for the greatest number of residents from those areas. Or in a way that serves the most pressing needs of residents of those areas in the best way; be that through fewest transfers, highest frequency, shortest trip times, or lowest cost. Some agencies already do this, though, as past research has found, approaches to this practice are "generally ad hoc" and particularly difficult to coordinate cross-jurisdictionally in low-density or sprawled areas (Zimmerman et al. 2022).

2.4.1 Challenges to Building Equitable TOD with High Levels of Affordability

A host of barriers impede the ease and proliferation of eTOD. Some of these affect TODs generally, while others exist uniquely with respect to implementing high levels of affordability. These barriers can be framed categorically in terms of 1) cultural and social barriers; 2) barriers related to planning processes and requirements; 3) financial barriers; and 4) barriers associated with transit service. Table II-3 summarizes research on these hurdles.

With respect to cultural and social barriers, scholarship reveals that car culture and identity prejudices hinder the integration of affordable housing and transit prioritization. Tan et al. (2014) finds that, in periods during which pro-car policies (e.g., free parking) are implemented, it becomes harder for developers to include more affordable units in mixed-income TODs. This is due, in part, to the views of lenders and neighborhood residents that larger amounts of parking need to be provided. The research team notes that the fervor of these views and the associated push-back against projects lessens during implementation periods of car-limiting policies (e.g., restrictions on second-vehicle ownership, high costs for second parking permits, and drive-day limitations).

The role played by racial and class-based prejudice—common throughout U.S. history (Taylor 2019)—in resisting affordable TOD projects is also not to be ignored. ETOD assures a mixing of people of different incomes. Through an examination of TOD efforts in the Chicago and Washington, DC metropolitan areas, Lung-Amam et al. (2015) find that racial and class-based prejudices serve as the undercurrent of resistance to projects centering affordability. Noland et al. (2017) identify similar outcomes in their study of transit villages throughout New Jersey. Relatedly, Barklage's (2013) work unearths that this prejudice is regularly dressed up as resistance to upzoning and densification, particularly in suburban neighborhoods near park-and-ride commuter stations.

Barriers from the planning side of development processes abound. Lack of interjurisdictional coordination, ill-equipped trip models, and onerous planning requirements often hinder TOD implementation, both with and without high levels of affordability. Lack of institutional coordination, especially when bringing together multiple local jurisdictions, has proven challenging (Garde et al. 2013; Staricco and Brovarone 2018). Tan et al. (2014) stress that fundamental to this problem is the proliferation of uncoordinated actors involved in management of stations and surrounding areas.

Garde et al. (2023) note that uncertainties inherent in the approvals process, such as public meeting requirements, can delay project approval. Nedwick and Burnett (2015) argue that severe inflexibility in planning requirements disincentivize integrating affordable units into TOD, with developers choosing faster, clearer approvals processes that are possible with just market-rate units. As noted, some zoning rules fail to account for differences inherent in affordable versus market-rate housing, such as in terms of minimum parking requirements or transportation impact fees, which do not adjust for the lower driving rates of residents with low incomes (Howell et al. 2018; Weinberger et al. 2019). This can result in affordable projects becoming more expensive to complete and less feasible.

Financial barriers are perhaps the most difficult to overcome for affordable TOD projects. Several scholars stress that TOD investments are hampered by a lack of dedicated funding and the perception by lenders that they are high risk, particularly TODs with a high level of affordable housing on site (Barklage 2013; Cervero and Dai 2014). Though some municipalities provide dedicated TOD funding programs, those offerings are few and far between, with significant program administration capacity requirements for fund applicants and recipients, which may limit their broad effectiveness (Reconnecting America 2010).

It is also true that traditional approaches to mixed-use development, in which ground-floor commercial rents cover a high share of development costs, may be ill-suited to TOD with high affordability as retailers

that can afford higher rents may not well-serve a lower-income client base (Dwight 2017). Project sponsors also struggle to identify funding sources for supportive infrastructure such as public amenities, that accompany TODs (Belzer and Autler 2002).

Finally, research suggests the T in 'affordable TOD' is often ignored, in part because of changes in public perceptions. Boelleter et al. (2021) note that the desirability of being located near transit may be waning. In cities across the US, transit ridership was decreasing prior to the Covid–19 pandemic; transit systems continue to struggle with recovery (Freemark and Rennert 2023). This may contribute to lessening confidence in TOD as a planning strategy. Moreover, though transit systems are most likely to experience increased ridership with improved quality of service, there are limited funds available for the operational enhancements needed to make transit attractive enough to residents to encourage relocation to TODs and to, in turn, incite increased ridership (Cervero and Murakami 2009; Yang et al. 2016). There are few mechanisms for developers to contribute to improved service (Nelson and Niles 1999), though there are sometimes opportunities for developers to fund capital improvements, such as bus shelters or new subway station entrances, in coordination with projects. Mathur and Gatdula (2023) note that poor transit service may contribute to localities ultimately failing to keep living costs affordable even for those in transit-proximate subsidized housing; if transit fails to meet their travel needs, increased vehicle use may result.

Table 2-3. Barriers to equitable TOD

Study	*Geography and period*	*Method*	*Finding*
Cultural and social barriers. Synthesis finding: Car culture and identity prejudices hinder affordability integration and transit prioritization			
Tan et al. 2014	Netherlands, multiple regions nationwide covering policies that extend back to the 1970s	22 interviews and 2 focus groups (24 participants) with TOD stakeholders from public and private sectors across transportation and land use, plus policy analysis.	Find that pro-car policies can make implementation difficult. Authors argue that in periods of pro-car policies, it may be harder for developers to include more affordable units as views that space need by allocated for greater amounts of parking may be strong.
Lung-Amam et al. 2015	US, nationwide with specific focus on the metro areas of Chicago, IL and Washington DC since 2005	Case study analysis.	Equitable TOD assures mixing of people of different incomes. Given U.S. histories of stringent segregation, this has implication, in many metro-areas related to racial diversification as well. In many cases, racial and class-based prejudices serve as the undercurrent of resistance to equitable TOD among the public.
Noland et al. 2017	Four transit villages across New Jersey between 2011 and 2012 served by two different transit providers and four different rail lines	14 interviews with planners and developers and focus groups with 38 participants who were residents of the four transit village neighborhoods.	Find that resistance from neighborhood residents is associated with the belief that increasing density as well as developing desirable mix-use areas will worsen neighborhood traffic despite the heightened walkability and the proximity to transit service. Authors also find that anti-densification is often laced with racialized and class-based undertones.
Planning barriers. Synthesis finding: Interjurisdictional coordination, ill-equipped trip models, and onerous planning requirements are major barriers to TOD, both with and without a high level of affordability.			
Garde et al. 2023	10 transit stations in Los Angeles and Orange counties, California. Interviews conducted in 2022 and 2023	Interviews with planners, policymakers, and developers involved in achieving affordable housing.	Find that TOD plans typically fail to offer a vision for an inclusive community in their story telling and marketing elements (i.e. narrative crafting). Additionally, onerous requirements for securing subsidies, uncertainties in the approval process, and high competition for parcels from market-rate housing developers jeopardize project approval.
Staricco and Brovarone, 2018	Global, with Netherlands and Italy	Review of practices and case study analysis.	Highlight that a lack of institutional coordination, especially when bringing together several jurisdictions to form a regional planning effort,

Study	*Geography and period*	*Method*	*Finding*
	as two nation-level case studies		serves as a major barrier. Especially when jurisdiction have different determinations of affordability.
Weinberger et al. 2015	16 sites in Washington DC (2012 – 2014)	Field counts compared against trip generation analysis using ITE model.	Authors raise questions about the reliability of ITE models and find that they do not match peoples' actual travel. Common trip-gen methods do not reflect the reality that people bike, walk, and take transit rather than drive for many trips. This failing is even greater when it comes to modelling travel behavior of low-income travelers.
Nedwick and Burnett 2015	15 U.S. states between 2003 and 2013	Interviews with over 100 housing policy makers, developers, and transit policy experts. Hedonic regression of 'incentive' policy elements modeled against affordable unit inclusion.	Find that most incentives from the public sector – e.g. existing development bonuses, subsidies, and exemptions, tax credits – are still not enough to make the inclusion of affordable housing near transit financial worth undertaking for developers. Authors stress the intense disincentive effects caused by minimum parking requirements.
Financial barriers. Synthesis finding: Affordable TOD is hampered by a lack of dedicated funding and perceived high risk from lenders.			
Barklage 2013	Metro areas of Atlanta, GA, Denver CO, Portland, OR, San Francisco, CA, and Washington DC	Case study analysis.	Finds that lenders view TOD as a riskier type of development style than other types – in part due to comparatively low parking creation – and are reluctant to fund TOD projects as a result. This fear of low returns on investment is heightened when unit affordability is incorporated into the project. Also finds that large enough parcels along existing rail lines to make TOD financially appealing are a rarity in many U.S. metro area weakening developer interest.
Cervero and Dai 2014	27 global cities between 2005 and 2014	Survey analysis and predictive modelling.	Focusing on BRT, authors find that the lack of a dedicated funding source tops the list of barriers to affordable TOD implementation.
Howell et al. 2018	State of California between 2010 and 2012	Evaluation of development review requirements and the predicted travel behavior measures that inform them against realized travel behavior as determined via the California Household travel survey.	Despite the fact that low income people travel a lot less than higher income, market-rate housing residents, they are subject to the same amount of impact fees. This results in over-assessments of transportation impact associated with developing affordable housing.
Dwight 2017	Chicago metro area between 1990s and 2015	Case study analysis of TOD plans.	Find that traditional approaches to mixed use development, in which ground floor commercial rents functionally subsidize some of the cost of housing, are particularly ill-suited to equitable TOD as retail that can afford higher rents may not well-serve a lower-income client base.
Belzer and Autler 2002	US, nationwide from 2000 to 2002	Combination of review of scholarship and TOD plans	Even in cases where a strategy exists for financing the basic components of a project, a defined funding source is rarely available to cover many of the "place making" features that smooth the transition between place and transit node. Authors find that this holds particular true for mixed-income, partially affordable TOD efforts.
Transit service barriers. Synthesis finding: The T in 'affordable TOD' is going underattended to; this may distinctly impact low-income residents in cases where affordability does get integrated into TODs and can impact the final price tag for TOD developers.			

Study	*Geography and period*	*Method*	*Finding*
Nelson and Niles 1999	US, nationwide 1990 to 1998	Review of literature and examination of degree to which developments were intentional about adopting New Urbanist ideals/practices.	The mode choice factors that impact transit selection beyond residential proximity apply in TODs just as they do in dense urban cores. Authors stress that planners and developers of TOD have demonstrated a lack of attention to this reality resulting in unattractive transit access and service infrastructure impeding TOD success. They also suggest that there are not readily available mechanisms for developers to directly contribute to transit operation budgets specific to TOD sites in many cases.
Boelleter et al. 2021	Perth, Australia in 2013	13 semi-structured interviews with participants involved in TOD conceptualization, planning, design, and/or development.	Authors note that year-over-year waning in transit patronage has shaken confidence in the TOD model among many. It has also contributed to continued divestment from transit in the public sector contributing to ill-maintain infrastructure. This then increases the investment needed from the private sector for attractive placemaking which further increased overall project and makes integration of affordability a greater lift.
Yang et al. 2016	All metro stations in Shenzhen, China between 2000 and 2014	Regression analysis (spatial lag model).	Findings suggest that infill stations in denser areas with a greater number of proximate transit connections and higher service frequencies might be more expensive to develop in the short run, but offer greater propensity for land value capture and commercial desirability that can substitute affordable housing sustainably in the longer run.
Mathur and Gatdula, 2023	Nationwide, 2022–2023	Survey of 30 of the largest 101 transit agencies in the U.S. plus review of the TOD barriers literature.	Low levels of service, poor frequency in particular, significantly hold TODs back from achieving its objectives. Vehicular travel still, for many TODs, continues to have performance competitive advantage. Authors find that even in cases where this does not hinder eTOD development, it contributes to a failing to keep living costs affordable even for those in subsidized housing, as their vehicular needs may increase (this could be carpooling, ride-hailing, etc.).

Chapter 3

Summary of Case Studies Linking Affordable Housing and Transit

3.1 A Comparative Overview of the Case Studies

Both transit agencies and communities across the United States have increasingly sought to encourage TOD, particularly TOD integrating affordable housing. Drawing from interviews and publicly available data, these case studies reveal how ten U.S. metropolitan areas are navigating the goal of linking affordable housing and transit. Integrated planning for these two policy areas can reduce individuals' cost of living by expanding access to affordable mobility options while guaranteeing that transit-accessible neighborhoods are affordable to live in for residents of a variety of incomes.

To understand how different regions have approached the goal of better integrating affordable housing and transit, the research team first collected available information from web-based sources about the variety of strategies that transit agencies, and other governmental units have undertaken. The team then undertook interviews with staff representing public agencies in each region to understand their perspectives on the successes and challenges to achieving positive outcomes.

The project team worked with the study's advisory panel to select the following ten case study locations: (1) Austin, (2) Bay Area, (3) Chicago, (4) Denver, (5) Huntsville, (6) Minneapolis-St. Paul, (7) New Jersey, (8) Raleigh, (9) Salt Lake City, and (10) Seattle. This section summarizes the findings from each case study and includes key information about each case's local demographics, transit services, TOD experience, and approaches to affordable housing. For each case, key lessons and innovative tools that may be useful for other regions are described. The sources for the facts in these summaries are identified in the detailed case studies presented the appendix. The map in Figure III-1 shows the location of these regions.

Figure 3-1. Map of Case Study locations

3.1.1 Characteristics of the Case-Study Regions and Transit Systems

These regions offer a broad view of conditions across the United States, and range from very large regions, like Chicago, to much smaller metropolitan areas, like Huntsville; the regions also vary substantially in terms of population growth and household incomes. In each example, the case study enables us to explore how transit agencies are working with governments, private developers, and nonprofit

organizations to advance affordable TOD. Table III-1 summarizes some of that information for comparative purposes, with data on the entire United States also shown.

Nine of the regions are metropolitan areas, with one, New Jersey, being a full state; in each case, we explore local jurisdictional configurations, local demographics, and transit system offerings. The transit systems we profile range from heavily used systems, such as Sound Transit, to relatively small operations, such as Huntsville's Orbit. All of the case study regions and their respective transit agencies have bus services, and most also offer light rail and commuter rail. In the Bay Area, we focus on the region's heavy rail BART system; we also examine the heavy rail transit option offered by the Chicago Transit Authority.

Table 3-1. Information about each case study region

	Case Study Transit Agency	*Bus, Light Rail (LR), Heavy Rail (HR), Commuter Rail (CR)*	*Metro area population (2023)*	*Metro area population growth (2020 to 2023)*	*Metro area median household income (2022)*	*Metro area percent of commuters using transit to work*
Austin	CapMetro	Bus, LR, CR	2.5 million	7.5%	$94,604	1%
Bay Area*	BART	HR	4.6 million	–3.7%	$128,151	8%
Chicago*	CTA, Metra	Bus, HR, CR	9.2 million	–1.8%	$82,914	7%
Denver	RTD	Bus, LR, CR	2.9 million	1.2%	$98,975	2%
Huntsville	Orbit	Bus	0.5 million	6.6%	$84,929	0.1%
Minneapolis–St. Paul	Metro Transit	Bus, LR, CR	3.7 million	0.5%	$91,341	2%
New Jersey*	NJ Transit	Bus, LR, CR	9.3 million	1.2%	$96,346	9%
Raleigh	GoRaleigh	Bus	1.5 million	6.5%	$92,739	<1%
Salt Lake City	UTA	Bus, LR, CR	1.3 million	0.6%	$91,891	2%
Seattle*	Sound Transit	Bus, LR, CR	4 million	0.4%	$106,909	5%
U.S.	N/A	N/A	335 million	1.5%	$74,580	3.1%

Source: The authors, based on a review of data from the transit agencies and the U.S. Census. * These areas have other major transit operators that we do not examine as part of this research.

Housing affordability varies dramatically between the regions. We identify two indices that compare access to affordable housing across regions: one for renters and the other for home buyers. Note that the regions defined by these two indexes are not exactly the same as each transit agency's service area.

Each year, the National Low Income Housing Coalition estimates the availability of affordable rental homes for households at or below certain levels of AMI. Across the U.S., there are 56 affordable and available units per 100 households who earn at or below 50 percent of the area median income. Affordable homes are those with rents that do not exceed 30 percent of a household income. In Table III-2, we rank the case study areas in terms of this affordability metric. The Seattle metropolitan area only has 39 units

available for low-income renters—compared with 74 in the Raleigh metropolitan area. We emphasize that the statistics presented in Table III-2 do not fully capture the difficulty of affording rent in very expensive cities such as San Francisco, because AMIs there are so high. In other words, a person with a similar income could potentially afford more units in Austin than San Francisco, even though the latter city ranks as more affordable according to these data.

Table 3-2. Availability of affordable rental homes

Metropolitan Area	*Number of homes available and affordable per 100 renters at or below 50% of area median income*
Seattle-Tacoma-Bellevue WA	39
Denver-Aurora-Lakewood CO	41
Austin-Round Rock-Georgetown TX	46
New Jersey: New York-Newark-Jersey City NY-NJ-PA	46
San Francisco-Oakland-Berkeley CA	48
Utah (statewide; not specific to Salt Lake City metro area)	57
Chicago-Naperville-Elgin IL-IN-WI	58
New Jersey: Philadelphia-Camden-Wilmington PA-NJ-DE-MD	61
Minneapolis-St. Paul-Bloomington MN-WI	61
Raleigh-Cary NC	74
Alabama (statewide; not specific to Huntsville)	74

Source: The authors, based on a review of data from the National Low Income Housing Coalition.

We also identified comparative levels of housing affordability for homeowners. The National Association of Realtors' Housing Affordability Index measures whether or not the typical family in each region earns enough income to qualify for a mortgage loan on a typical home. An index above 100 signifies that a family earning the median income has more than enough income to qualify for a mortgage loan on a median-priced single-family home, assuming a 20 percent down payment. The most recent data, as shown in Table III-3, is from 2022.

Higher values indicate a greater percentage of families can afford a single-family home. Among the case studies, this indicates that housing is least affordable in the Bay Area and Seattle, while the most affordable opportunities for homeownership are in Huntsville and southern New Jersey. These statistics do no line up exactly with those presented in Table III-2, our effort to compare affordability for renters. Nonetheless, together, they offer a portrait of overall housing affordability for each case study.

Table 3-3. Realtors' Housing Affordability Index

Metropolitan Area	*Index (2022)*
San Francisco / Bay Area	47
Seattle	78
Denver	80
Northern New Jersey: New York-Newark-Jersey City	81
Salt Lake City	83
Austin	94

Raleigh	106
Chicago-Naperville-Elgin	133
Minneapolis-St. Paul-Bloomington (MN-WI)	141
Huntsville	142
Southern New Jersey: Philadelphia-Camden-Wilmington	144

Source: The authors, based on a review of data from the National Association of Realtors.

3.1.2 Integration of Transit and Affordable Housing Across the Case Studies

We sought to provide a baseline analysis of the degree to which each of the case studies has integrated housing—particularly affordable housing—in areas adjacent to transit services. We examine both "regular" bus service, defined as any bus routes operated by transit providers, and also fixed-guideway transit, defined as bus rapid transit, light rail, commuter rail, and heavy rail. We consider conditions in each case study area in terms of distances of a quarter or half mile of those transit services. Overall, we find that the different case studies vary tremendously in terms of the existing link between housing and transit, but we do find that, in all of the case studies, federally subsidized affordable housing is more likely to be located near transit than is housing overall.

We began by using US Census data to estimate the share of housing units in each case study area that is within reasonable distance of transit (figure III-1). In six of the case studies (Bay Area, Chicago, Denver, New Jersey, Salt Lake City, and Seattle), greater than 50 percent of units are located within a quarter mile of a regular bus route. Austin, Huntsville, and Raleigh have much lower levels of accessibility. Housing located near fixed-guideway transit is most common in the Bay Area, Chicago, and Seattle, where greater than 20 percent of the housing units are located within a half mile of rail and bus rapid transit stations.

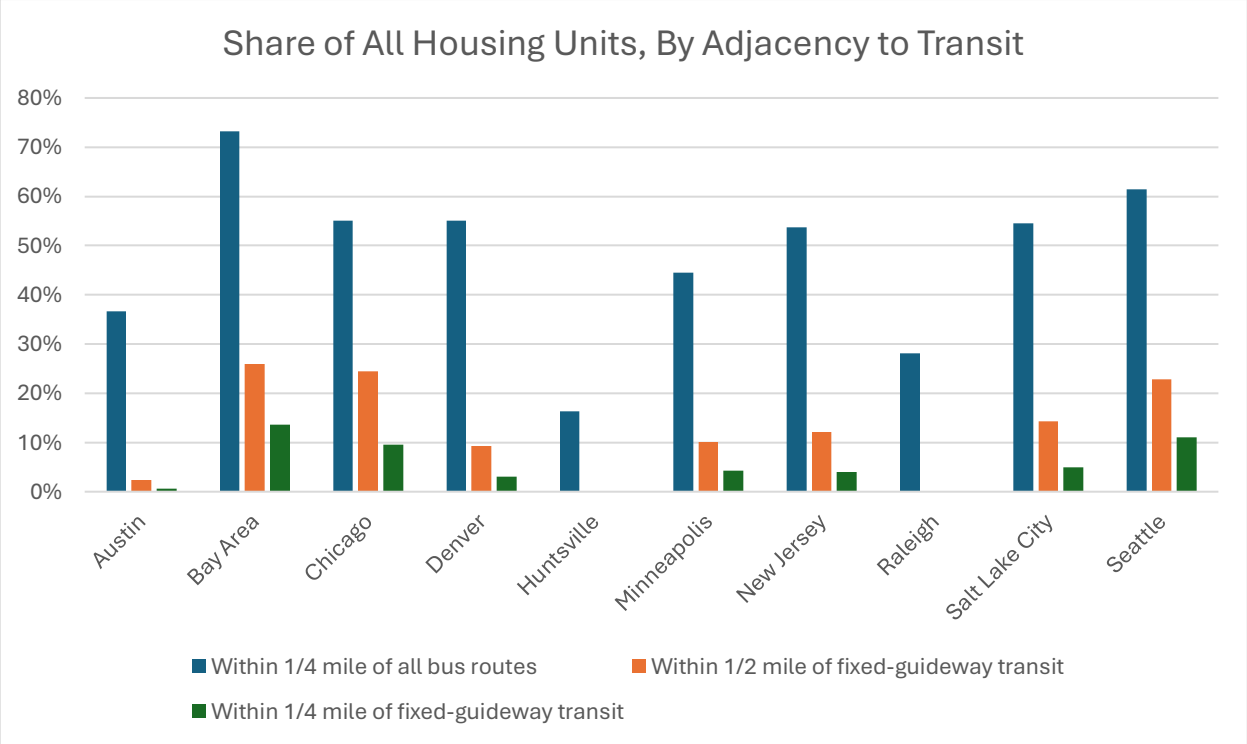


Figure 3-2. Share of housing that is located within reasonable distance of transit options, by case study

Source: The authors, based on a review of data from Transit Explorer, National Transit Atlas, and US Census 2020.
Note: Calculated at the tract level/ Data for core based statistical areas, except for New Jersey, which is statewide. Neither Huntsville nor Raleigh has any fixed-guideway transit, defined as bus rapid transit, light rail, commuter rail, or heavy rail.

Among the case studies with fixed-guideway transit options (neither Huntsville nor Raleigh has such routes at the present), we find that housing that has been completed over the past two decades is more likely to have been built near those lines' stations (these are primarily rail stations). For example, among homes located within a quarter mile of fixed-guideway rail stations in New Jersey, 24 percent of these were completed since 2000; but only 15 percent of homes statewide were completed over that period. That said, adjacency to regular bus routes is not associated with higher rates of recent construction in any of the case studies.

Next, we explored the location of federally subsidized affordable housing and the degree to which those units are likely to be located near transit. Federally subsidized units, supported through the Low Income Housing Tax Credit, public housing, and project-based Section 8 programs, among others, are designed to guarantee affordability for people with low and moderate incomes. (As described in Chapter 2, federally subsidized housing is just one type of affordable housing; many units on the private real estate market, without subsidies, are also affordable to people with moderate incomes.)

Overall, the case studies had between 2.7 and 5 subsidized housing units for every 100 housing units overall, with Huntsville having the least and Seattle having the most. The degree to which these units are accessible to transit varies between the case studies as well (Figure III-2). In each case study area, these subsidized units are more likely to be located near transit of than housing overall (as is visible in a comparison with Figure III-1). In the Bay Area, Chicago, Denver, New Jersey, Salt Lake City, and Seattle, more than 80 percent of such units are located within a quarter mile of a bus route. Access to transit is less common in Austin, Huntsville, and Raleigh, yet still a majority of federally subsidized units in those areas is located within each walk of a bus route.

Subsidized units are also substantially more likely to be located near fixed-guideway transit than are housing units overall. In the Bay Area, Chicago, Salt Lake City, and Seattle, about half of all subsidized units are located within a half mile of fixed-guideway stations. In Seattle, greater than 30 percent of such units are located within a quarter mile of those stations. This speaks, first, to those regions' extensive fixed-guideway transit systems, and second, to efforts to ensure that subsidized units are located near transit.

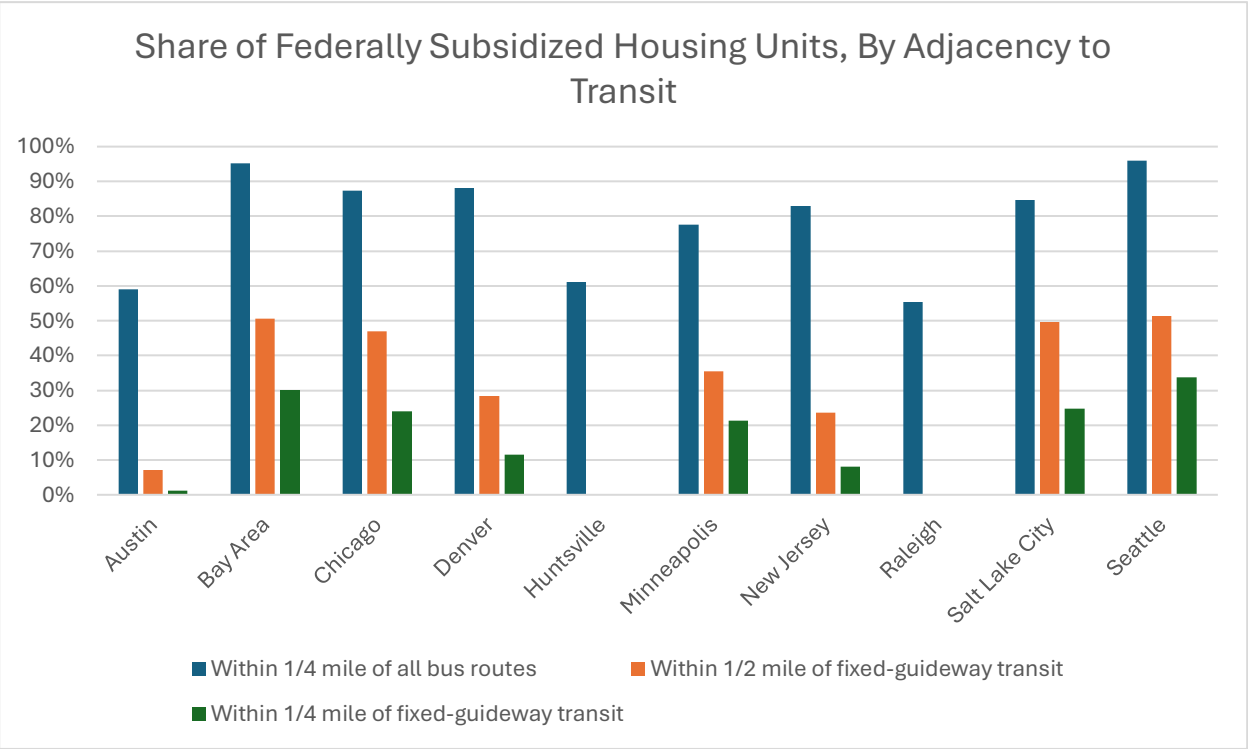


Figure 3-3. Share of federally subsidized housing that is located within reasonable distance of transit options, by case study

Source: The authors, based on a review of data from Transit Explorer, National Transit Atlas, and National Housing Preservation Database. **Note:** Federally subsidized affordable housing units are defined as project-based units subsidized by the Low Income Housing Tax Credit, public housing, project-based Section 8, Section 202, and/or Section 811 programs. Data for core based statistical areas, except for New Jersey, which is statewide. Neither Huntsville nor Raleigh has any fixed-guideway transit, defined as bus rapid transit, light rail, commuter rail, or heavy rail.

What is clear is that adjacency to transit is associated to higher levels of transit use. In each of the case study areas, we find that residents of neighborhoods within a quarter mile of regular bus lines are more likely to be transit commuters than residents of each case study overall (Figure III-3). We find that adjacency to fixed-guideway transit is even more likely to be associated with transit use. For example, regionwide in Chicago, about 9 percent of commuters use transit to get to work. Among those who live within a quarter mile of fixed-guideway transit stations, about 25 percent do. This suggests that, following our findings in Chapter 2, TOD can play an essential role in expanding transit use.

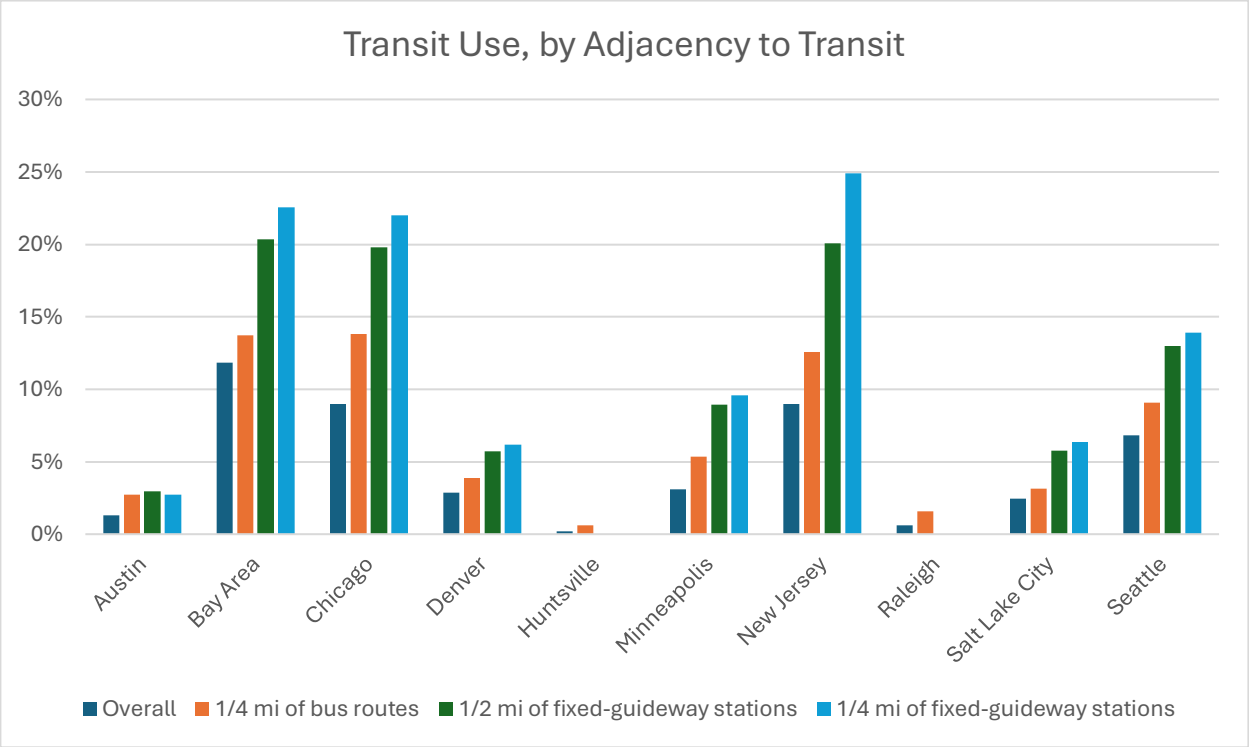


Figure 3-4. Use of transit to commute by adjacency to transit, by case study

Source: The authors, based on a review of data from Transit Explorer, National Transit Atlas, and US Census American Community Survey, five-year data, 2018–22. Calculated at the tract level. **Note:** Data for core based statistical areas, except for New Jersey, which is statewide. Neither Huntsville nor Raleigh has any fixed-guideway transit, defined as bus rapid transit, light rail, commuter rail, or heavy rail.

When it comes to overall housing costs in areas adjacent to transit, we find a variety of trends related to median rents (Figure III-4). In no case study are rents substantially higher in areas near regular bus lines (in fact, in some case studies, rents are lower therein). In Chicago and New Jersey, rents are somewhat higher in areas near fixed-guideway stations. But in the Bay Area, they are somewhat lower in those areas. This suggests that there is no uniform link between transit access and rental costs.

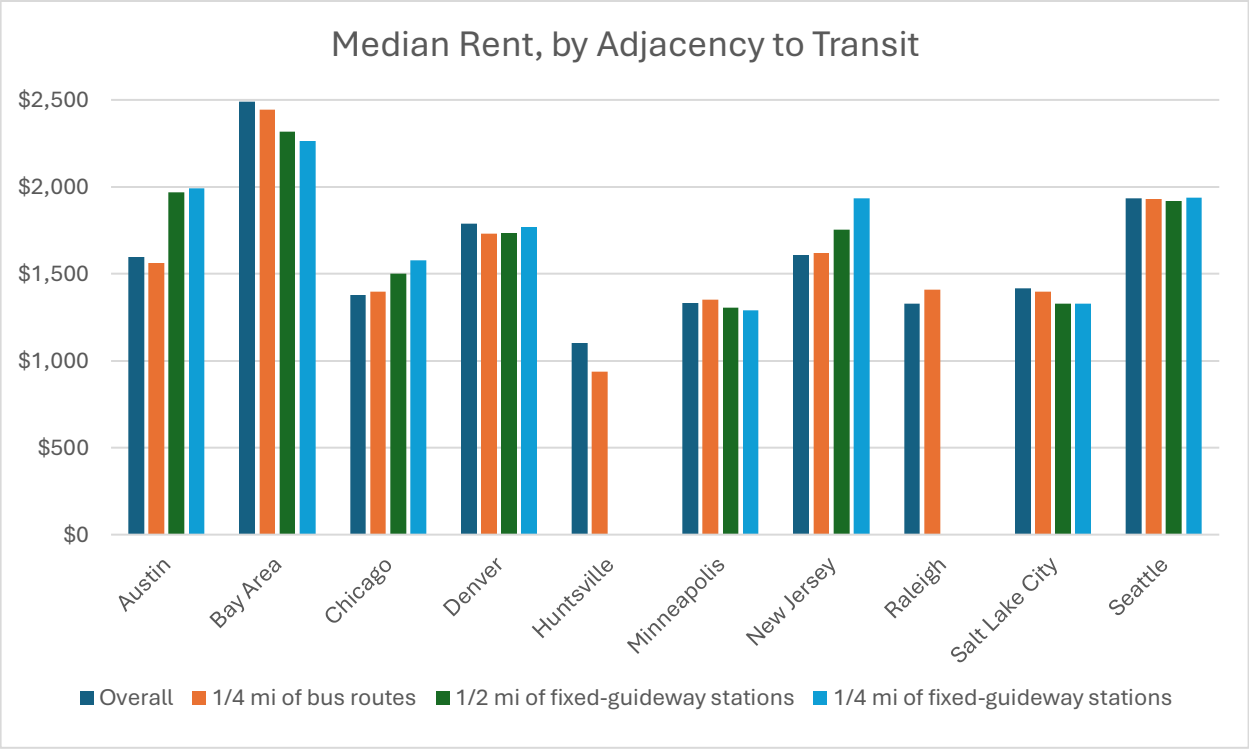


Figure 3-5. Median rent, by adjacency to transit, by case study

Source: The authors, based on a review of data from Transit Explorer, National Transit Atlas, and US Census American Community Survey, five-year data, 2018–22. **Note:** Data for core based statistical areas, except for New Jersey, which is statewide. Calculated at the tract level. Neither Huntsville nor Raleigh has any fixed-guideway transit, defined as bus rapid transit, light rail, commuter rail, or heavy rail.

We also examined other metrics of housing affordability in areas located near transit, including median household incomes and the share of renters that is cost burdened. We do not find any association between those characteristics of any of the case studies and access to transit.

3.2 Case Study Summaries

3.2.1 Austin

Between 2010 and 2022, the Austin region was the fastest-growing large metropolitan area in the country, and its remarkable growth is expected to continue. The region's population in 2050 is expected to be 3.8 million, more than triple its 1.2 million population in 2000. Among the case studies, the Austin region ranks in the middle on the homeownership affordability index. However, it has fewer affordable and available affordable rental units for households with incomes below 50 percent of the area median income than most of the other case study regions.

The Capital Metropolitan Transportation Authority (CapMetro) operates commuter rail and bus services in the region. In 2020, voters approved a $7.1 billion transit expansion project (designed to include new light rail, commuter rail, and bus rapid transit services) that dedicates $300 million in funds for transit-supportive anti-displacement housing strategies. To date, anti-displacement funds have been allocated

towards a wide range of programs, including land acquisition, job training and occupational skills training, educating tenants about their rights, and assisting them with rent and utilities.

CapMetro has received five FTA TOD planning grants to conduct studies, prepare plans, and develop tools related to TOD. These funds have enabled CapMetro to develop several key resources. One of these is an ETOD study that outlines objectives, goals, and a community engagement process. Additionally, CapMetro has created a policy toolkit that includes a comprehensive set of 46 policy measures addressing workforce development, housing, mobility, land use, and real estate. The funding has also supported the development of an interactive conditions analysis tool. Lastly, CapMetro has introduced a priority tool that maps out ETOD areas and allows users to identify appropriate ETOD policies.

CapMetro officials have identified numerous barriers that local agencies face when undertaking TOD and affordable housing projects, including market conditions, insufficient zoning incentives, as well as overly optimistic public expectations about how affordable housing is feasible. In interviews with the study team, agency officials noted that many people do not realize affordable housing is often embedded in mixed-income housing developments, and its design and construction are indistinguishable from market-rate housing. The officials also explained that pushback from communities can be expected when projects completely change the characteristics of existing neighborhoods.

The agency's TOD reports and recommendations have led to meaningful changes in the region's approach to affordable housing and transit. In 2023 and 2024, the city of Austin adopted numerous zoning reforms to increase the production of affordable homes, including decreasing the minimum single family lot size and allowing denser development near the planned CapMetro stations. The city also eliminated minimum off-street parking requirements for residential and commercial developments in response to their finding that parking mandates added to the cost of construction. The transit agency and the City of Austin have worked collaboratively to integrate transit and land use planning, creating a wealth of comprehensive information and tools that are being used in advance of its major expansion program.

CapMetro has pursued some TOD projects that could be a model for other parts of the country. For example, one TOD cited in the detailed case study in the appendix is a mixed-use development on a ten-acre site that CapMetro owned near one of its stations. The project, completed in 2020, includes 800 apartments, almost 20 percent of which are designated affordable.

3.2.2 Bay Area (San Francisco)

Among the 25 most populous U.S. metropolitan areas, only a select few have median household incomes exceeding $100,000. These regions include Boston, San Francisco, Seattle, and Washington, D.C., with the San Francisco Bay Area ranking at the top. This economic prosperity, however, comes with a steep cost of living. Notably, the Bay Area is home to some of the highest rents and housing prices in the nation, making housing affordability a critical policy issue for local governments, transit agencies, and urban planners.

The San Francisco Bay Area Rapid Transit District (BART) system has been providing heavy rail service since 1972. Its five lines were primarily designed so that suburban residents could park their cars at stations and then take trains to major employment centers (such as those in San Francisco, Oakland, and Berkeley). BART currently owns and operates more than 47,000 parking spaces at 36 stations. It has determined that approximately 250 acres around 27 of its train stations have development potential.

In 2016, the BART Board adopted ambitious TOD goals for its properties, including completing 20,000 residential units and 4.5 million square feet of commercial space by 2040. The agency's goal is for 35 percent of the new units to be affordable. Since 1993, the agency has led or assisted in the completion of 20 TOD projects which collectively include nearly 1,300 affordable units.

BART's TOD strategies include favoring ground leases of no more than 66 years (rather than selling its properties, as is a common strategy elsewhere), soliciting proposals for TOD in localities that have an adopted plan allowing for transit-supportive land uses, and providing up to a 60 percent discount in ground leases for projects with at least 35 percent affordable housing. The agency's TOD Guidelines document provides clarity about its expectations both on its property and within the larger station area. BART undertakes a six-step process for developing its sites: working with jurisdictions and understanding the real estate market, running a competitive process to select a site developer, working with the developer, preconstruction activities, construction, and occupancy.

In 2024, BART's ridership reached 50.7 million, which was an increase from 47.6 million in 2023. Yet, BART's 2024 ridership was 43% lower than its 2019 level of 117 million riders. The agency has reported that development within a half mile of its stations is crucial for boosting ridership. One study found that TOD residents commute by transit five times more than the average worker in the same city, and TOD office workers commute by transit 3.5 times more than workers in the surrounding region. To determine if and how many parking spaces it can eliminate on its property, BART uses a parking replacement model to quantify the ridership and revenue impacts of different TOD scenarios. The agency notes that building TOD on BART property will attract new riders, but the increase may be offset if the number of parking spaces is reduced, and some drivers stop taking BART.

Alongside the transit agency's TOD efforts, statewide policies encourage both TOD and affordable housing. California requires all cities and counties to adopt a housing element as part of their general plans to identify how they will grow and develop. This has spurred some jurisdictions in the Bay Area to consider new development in areas around BART stations. Moreover, in 2018, the state legislature passed a law requiring BART to establish zoning standards that conform with TOD on certain BART owned land and for local jurisdictions to recognize these standards as the base zoning for BART-owned land.

In interviews with the research team, BART staff noted that projects with affordable housing have been progressing more quickly than those with market-rate housing, due to the combination of the high borrowing costs faced by market-rate developers and the availability of affordable housing funds. For example, voters in Alameda County (which includes Oakland and Berkeley), overwhelmingly approved a referendum in 2016 for the county to issue up to $580 million in bonds to support the creation of an expected 3,800 affordable homes.

The detailed case study in the appendix cites two TOD examples, both of which are located in Alameda County. In the city of Hayward, a public-private partnership redeveloped a site with a BART parking lot into a mixed-income community. In Berkeley, BART is leading, in collaboration with the city, to convert two BART parking lots into buildings with affordable housing.

Key lessons derived from this case study underscores the importance of early-stage planning, securing buy-in from both internal and external stakeholders, and maintaining flexibility in project design.

3.2.3 Chicago

The Regional Transportation Authority (RTA) provides financial oversight for the three major transit agencies in the region: the Chicago Transit Authority (CTA), Metra commuter rail, and Pace suburban bus. In addition to its transportation mission, the RTA also manages a grant program called the Community Planning program, which provides funding and technical assistance to local governments. In recent years, RTA has placed a greater emphasis on affordable housing, and it now prioritizes funding for communities with a lens toward equity and financial capacity. The agency uses the term ETOD rather than just TOD to refer to these plans, exemplifying the agency's focus on developing plans that consider equity in analysis, community engagement, and plan recommendations.

Since the transit agencies do not control land use, cooperation from the communities with land use jurisdiction is essential to creating transit supportive development. The City of Chicago takes the lead in ETOD planning while CTA works closely with the city's planning and transportation departments and is a member of the city's ETOD Working Group.

In 2021, the City of Chicago's Plan Commission unanimously adopted an ETOD policy plan which established equity as a guiding framework for TOD initiatives moving forward. The following year, the City Council passed the Connected Communities Ordinance, which implemented key ETOD provisions including strengthening incentives for developers that provide affordable units. The highest zoning bonus is now only available to developers whose projects provide affordable housing units on site. The city has also eliminated parking mandates for projects located within a TOD area, if half or more of the dwelling units are assisted or affordable housing.

Historically, Metra has been actively involved in the development of TOD plans funded by the RTA and the region's MPO, the Chicago Metropolitan Agency for Planning. However, Metra has not actively led many redevelopment efforts, often looking to communities to initiate discussions about potential development. Starting in 2024, however, Metra's planners have begun taking a more proactive approach by reaching out to local officials and offering them suggestions about potential development opportunities. The agency's approach has evolved because ridership is still approximately 40 percent below pre-Covid levels, and a significant amount of its parking is underutilized.

Metra's planners told the research team they appreciate how both TOD and affordable housing can help their agency. TOD is consistent with Metra's recent efforts to evolve its service into a regional rail operations model that includes increased off-peak services. While historically, commuters parked at Metra stations in the morning and returned after work, TOD residents are more likely to use the railroad throughout the day and on weekends, exemplifying the symbiotic relationship between TOD and regional rail service models. Affordable housing is a crucial element of this mix as lower income residents are often more likely to use transit than those who live in market rate housing.

An important consideration for Metra's planners is whether potential development could have any negative impact on its riders. Metra wants to ensure that parking capacity will meet expected long-term demand, and the station will accommodate a wide range of access modes. Minimizing total travel times for commuters is a critical and complex issue, especially when a parking deck replaces a surface lot. The detailed case study describes two TOD examples in the Chicago region. The first relates to CTA laying the groundwork with a community for future affordable housing, while the second relates to RTA's Community Planning program.

Barriers to ETOD and affordable housing cited by RTA planners include: a preference by municipalities for market-rate over affordable apartments, the stigma of affordable housing, resistance in the suburbs to reducing parking requirements, and challenges of getting projects approved even in communities that have adopted TOD plans. The RTA noted that developers are sometimes hesitant about pursuing TOD projects when they are unfamiliar with community preferences and the approvals that would be needed.

Lessons identified in this case study include the benefit of establishing as-of-right zoning for TOD and adopting form-based codes to streamline approval processes. To overcome the stigma of "affordable housing" and "density," planners can reframe these concepts with terms like "workforce housing," "attainable housing," "variety of units," and "diversity."

3.2.4 Denver

The Regional Transportation District (RTD) provides bus and rail service throughout the Denver metropolitan area. In 2004, the region's voters approved a sales tax to fund one of the nation's largest transit

expansion programs, with the goal of encouraging growth along a new rail network. Since that time, there has been a significant concentration of growth near the region's transit lines. Although RTD's station areas make up only 0.6 percent of land area in the Denver metropolitan area, they contain 43 percent of the multifamily homes and 55 percent of the office space built between 2005 and 2022.

RTD currently manages more than 80 park-and-ride lots, offering a combined total of over 37,000 parking spaces for transit users. However, many of these facilities remain underutilized, presenting an opportunity for strategic redevelopment. Recognizing this potential, RTD has made TOD a priority, particularly on properties it owns but no longer requires for transit operations. The agency has increasingly collaborated with private developers to convert surface parking lots into mixed-use developments that integrate residential, commercial, and transit functions. Given that a substantial portion of RTD's infrastructure was originally financed through FTA grants, the agency must secure FTA approval before repurposing or transferring federally funded properties.

Among the issues related to RTD's TOD work, housing affordability is a major concern among the region's residents because the Denver metropolitan area is one of the least affordable regions in the U.S., for both renters and homebuyers. In response, the RTD Board approved an ETOD policy in 2021 whose goal is to "encourage affordable residential development for low-income households at and along high-frequency transit stations and corridors."

The ETOD policy is expected to generate revenue, increase transit use, and enhance community relationships. The policy sets a non-binding, aspirational goal that 35 percent of all housing developments on RTD property will be affordable to low-income households. The agency provides special help to affordable housing developers by expediting the agency's reviews of their proposals and being flexible in how much replacement transit parking it requires. The agency had been hesitant to make this change because parking spaces were an important part of the original transit system design. Parking revenue was not much of a factor in RTD's decision, though, since vehicles registered within RTD's boundaries can park for free at nearly all of RTD's parking lots for up to 24 hours.

Before implementing the ETOD policy, an RTD survey of residents living near stations found that low-income households typically use buses and trains more than market-rate residents and are less likely to own an automobile (this finding corresponds to our review of the literature, described above). This has given RTD an incentive to prioritize low-income housing near its stations. When the RTD's Board of Directors adopted the ETOD policy, media attention generated a great deal of interest among developers. According to the RTD, the policy's rollout not only attracted developers eager to participate in transit-oriented projects but also led to a notable increase in internal support and resources for TOD initiatives within the agency.

To determine which of RTD's properties have the greatest potential for TOD, agency staff consider numerous factors, including site size, zoning, parking utilization, infrastructure availability, local market conditions, community interest in redevelopment, and any unique site attributes or challenges. RTD has established an evaluation process that defines TOD-related roles and responsibilities of numerous units (departments) within the agency, including the TOD, real property, facilities maintenance, rail operations, bus operations, service development, planning, civil engineering/ urban design, finance, legal, safety, and security units.

In Denver's case, statewide policy changes are also part of the TOD and affordable housing experience. A new state law, signed by the governor in May 2024, is expected to promote TOD and affordable housing. The law mandates that local governments adopt zoning that allows at least 40 residential units per acre near certain rail stations.

The detailed case study in the appendix describes how one of RTD's properties, formerly used as a parking lot, will soon see construction of a 62-unit condominium building that is income-restricted to households earning up to 80 percent of the area median income. Notably, it will include only 26 parking spaces for cars, but 60 for bicycles.

3.2.5 Huntsville

Huntsville, Alabama is one of the nation's fastest-growing cities, blossoming from fewer than 17,000 in 1950 to more than 220,000 today. Much of the region's growth has been tied to the rocket and space industries. NASA's Marshall Space Flight Center is located just outside of Huntsville's borders, and it has attracted a wide range of professionals and businesses. It is part of the Redstone Arsenal, a U.S. Army installation, which employs approximately 50,000 individuals. Average rent in the city is only $1,230, compared to $1,739 for the U.S. Its average apartment size is also larger—950 square feet compared to 900 for the nation. Among the case studies, Huntsville is one of the most affordable regions to purchase a single-family home.

The current transportation network is heavily oriented towards automotive travel, and that is unlikely to change in the near term. As in many cities that experienced heavy growth during the latter half of the 20th century, the vast majority of its transportation infrastructure supports the automobile. Less than one percent of residents (in both the city and the metropolitan area) use transit to get to work. While very few residents use public transit, the City of Huntsville does operate its own bus services, called Orbit, funded by both city and federal funds. The fare is $1 and a monthly pass costs $30. Although its fares are low compared to most transit systems, its service schedule is limited. On weekdays, the bus only operates between 6 a.m. to 9 p.m., and there is no service on Sundays.

To improve its transit services, the City of Huntsville is now undertaking simultaneous BRT and TOD planning efforts. It is planning an 8.9-mile-long BRT corridor with 32 stations that would serve several key employment and activity centers. Huntsville will be seeking an FTA Capital Investment Small Starts grant for this project. In conjunction with its BRT plans, the city has secured federal funding to support TOD planning efforts. In May 2024, Huntsville was awarded an $850,000 FTA grant to facilitate TOD planning along the proposed BRT corridor. Notably, this grant is fully federally funded, with no state or local match required. The funding comes from the FTA's Pilot Program for TOD Planning, which in 2024 prioritized studies that included a strong focus on affordable housing.

As part of the city's TOD planning, city officials are now considering rewriting the zoning ordinance to encourage more affordable housing. Potential strategies include reducing parking minimums along high frequency transit corridors and establishing more zoning districts that could accommodate duplexes and accessory dwelling units. In addition, the city may offer a bonus (such as allowing additional building height) for developments that have affordable housing. These policy changes are designed to support a more diverse housing stock and accommodate the city's growing population.

However, the city is facing two major challenges relating to BRT: too few riders and too little funding. Some city officials may be hesitant to make substantial transit investments given Huntsville's relatively low ridership levels. Regarding the funding challenges, the state of Alabama does not provide any funds to support transit. In fact, a 1952 amendment to the state's constitution forbids it. The state did establish a Public Transportation Trust Fund in 2018, but it has never provided any money for this funding program.

Huntsville's experiences with BRT and TOD planning offer valuable lessons for other cities. First, the city's proactive approach to community engagement has played a crucial role in garnering support for these initiatives. By identifying community needs and collaborating with potential partners before formally proposing BRT corridors and TOD sites, planners have minimized opposition. Second, city officials have

employed strategic messaging to address concerns about affordable housing, such as reframing the conversation to "workforce housing" for essential professionals such as nurses, first responders, and teachers, they have helped shift public perceptions.

3.2.6 Minneapolis-St. Paul (Twin Cities) Region

The Twin Cities region (which includes Minneapolis, and St. Paul, and their suburbs) is home to nearly 60 percent of Minnesota's population, making it the third largest metropolitan area in the Midwest. The region's population grew modestly (0.5 percent) between 2020 and 2023. For potential homeowners, the Minneapolis-St. Paul area is relatively affordable compared to many other major metropolitan areas in the country.

The Metropolitan (Met) Council is the region's MPO. Its Metro Transit division is the region's primary public transit provider, operating buses (including bus rapid transit), light rail, and commuter rail services. The expansion of the region's two light rail lines has catalyzed TOD, spurring significant investment in mixed-use projects and improving connectivity.

Cities, counties, Metro Transit, and the Met Council all play a role in the development of TOD and transit-accessible affordable housing. Cities in the region regulate development. Their core responsibilities include comprehensive and station area planning, land use regulations, and public infrastructure planning. Counties do most of the initial analysis and planning for light rail projects. They also help fund transit capital and operating costs. In addition, some counties also have grant programs that award funding to promote TOD efforts.

Metro Transit's TOD office provides information on development opportunities and transit projects. The office promotes itself as a "one-stop shop for developers and urban planning professionals interested in pursuing or advancing TOD." Metro Transit also conducts studies and issues reports relating to TOD. It recently reported that 37 percent of the value of all development that has recently obtained permits is located along high frequency transit corridors. This development is in a geographical area that represents just 3.2 percent of the region's land area.

The Met Council has published a TOD Guide and developed tools to help communities and developers plan and implement TOD. Its TOD Guide and planning tools help municipalities and developers navigate the complexities of transit-oriented growth. Additionally, the Council administers annual grants to support TOD projects, with a strong emphasis on expanding and preserving affordable rental and homeownership opportunities.

Minneapolis' success in building new apartments has significantly expanded the city's housing supply while helping to stabilize rent prices. Between 2017 and 2022, the city increased its housing stock by 12 percent, yet rents grew by only 1 percent during that period. This growth has been driven by several key policy decisions. The city eliminated minimum parking requirements for new developments, reducing construction costs and making it easier to build new housing. It also promoted apartment development along commercial corridors. Additionally, Minneapolis established building height minimums in high-density zones, encouraging more efficient land use and greater housing capacity. Finally, the city allowed duplexes and triplexes on all residential lots, increasing the availability of multi-unit homes in previously single-family neighborhoods.

Three examples of TOD are cited in the detailed case study in the appendix. One is an apartment complex where all the units are affordable, and another is an example of a mixed-use and mixed-income project where residents have equal access to a high level of amenities regardless of how much they pay in rent. The third is a development that includes affordable housing with a focus on senior/assisted living.

In interviews with the research team, staff at Met Council, Metro Transit, and two counties identified a number of barriers to TOD and affordable housing, including restrictive zoning and community resistance in some suburban areas. Moreover, coordination in a region with seven counties and more than 180 units of governments (cities and townships) can be challenging. The detailed case study includes three key lessons for other regions. First, under certain market conditions, it may be easier to finance housing developments with affordable units compared to those with just market rate housing. Second, agencies should ensure that individual TOD projects are integrated within transit-oriented communities, where pedestrians and bicyclists feel safe, and people do not need cars. Third, large cities may not need as much engagement and assistance regarding TOD as suburban communities do.

3.2.7 New Jersey

NJ TRANSIT provides rail and bus services across New Jersey. Because of its proximity to New York City and Philadelphia, the state has one of the nation's highest levels of transit use: 9 percent of its workers commute by transit, compared with 3 percent for the entire country. Since potential TOD sites near its station usually include land owned by other entities, when promoting TOD, NJ Transit's planners need to emphasize collaboration, technical assistance, education, and partnerships.

As part of its TOD program, in 2022, the agency published a guide to assist municipalities, developers, state agencies, and other interested stakeholders with implementing TOD. This guide contains a useful list of funding sources that can help fund the planning, design and construction of TOD projects. It notes that projects usually obtain funding from a variety of sources for distinct tasks along a project's timeline. In April 2024, NJ TRANSIT published a TOD policy statement that identifies TOD's benefits; and the agency's goals, implementation actions, and supporting policies. Per its new policy and in accordance with state law, at least 20 percent of newly built residential units in TOD projects on land owned or controlled by the agency must be reserved for low- and moderate-income households.

New Jersey has a long history of legally guaranteeing the production of affordable housing. The state's requirement that every municipality provides its share of affordable housing is a powerful tool to encourage TOD with affordable housing. In addition, NJ TRANSIT's strong partnerships bolster its TOD efforts. The agency collaborates closely with a Rutgers University-affiliated research center that provides valuable resources, including a weekly TOD-related newsletter, TOD-related research, and a comprehensive TOD database. Additionally, NJ TRANSIT works with the New Jersey Department of Transportation (NJ DOT) on the Transit Village Initiative—a multi-agency program that incentivizes municipalities to revitalize areas surrounding transit stations using TOD principles.

NJ TRANSIT recommends that municipalities adopt as-of-right TOD supportive zoning because it demonstrates a municipality's commitment to embrace TOD, and developers benefit from knowing with certainty what they may or may not build. The detailed case study in the appendix describes several examples of TOD including a comprehensive TOD study along a 21-mile-long bus route, a residential building boom associated with a light rail line, and mixed-used developments near a train station.

NJ TRANSIT has been promoting TOD on adjacent properties since the 1990s. One of the agency's strengths is hiring planners who have the skills and experience needed to work with communities of all sizes, develop partnerships, and encourage land use decisions that promote TOD. The planning department's TOD unit also offers an important perspective about land use to other departments within the transit agency. NJ TRANSIT planners noted in interviews that it is important for a transit agency's TOD staff to break down silos within their agencies because TOD issues relate to many other departments including those focused on real estate, planning, government relations, and bus operations.

3.2.8 Raleigh

Raleigh, North Carolina, like Austin and Huntsville, is another fast-growing city in the country. While the nation's population grew less than 50 percent between 1980 and 2020, Raleigh's population more than tripled. Despite this growth, the region still has a comparatively high number of rental units affordable for residents earning less than half the median income compared to the other case studies.

The city-owned GoRaleigh transit service operates 39 bus routes, but no passenger rail service. In 2016, voters approved a half-cent sales tax increase to fund transit improvements including the development of four BRT lines. The City of Raleigh's planning department has taken the lead in planning the BRT routes and recommending zoning changes to encourage TOD. In 2020, the city published an Equitable TOD Guidebook that describes the city's development goals, TOD design principles, and station area types.

In 2021, the city updated the Transit Overlay District component of its zoning code to allow for TOD with more affordable housing. This zoning district is applied mostly on properties around the proposed BRT corridors that are already zoned for commercial and multi-family development. This district supports higher density levels needed to expand transit ridership and support the new BRT line. It also makes sure that the public spaces around the transit stations are comfortable for pedestrians. In the Transit Overlay District, a building can be 50 percent taller than the maximum height otherwise allowed if it includes affordable housing units. The number of affordable units must be at least 20 percent of the bonus units in the building. The units must be affordable for a family making 60 percent of the area median income or less and stay affordable for at least 30 years. No parking is required for any new development in any of Raleigh's zoning districts, including the Transit Overlay District.

The City of Raleigh has introduced an online interactive map designed to help residents, developers, and policymakers explore a wide range of geographical data, including property boundaries, city parks, and transit overlay districts. This tool provides a clearer understanding of where TODs are located and how they interact with existing land uses, supporting informed decision-making around urban planning and development.

Investment in affordable housing has also been a priority for the City of Raleigh. In 2020, 72 percent of Raleigh voters supported a referendum to create an $80 million affordable housing bond program that funds homebuyer assistance, rental development, public-private partnerships, owner-occupied home repair, as well as TOD site acquisition and preservation. In addition to the City's efforts, several community organizations in Raleigh are supportive of issues related to TOD and affordable housing. However, the city has faced some pushbacks to dense residential development in residential areas from homeowners who are worried that the new developments would lower their property values.

The Raleigh case study highlights three key lessons in ETOD. First, the city is well positioned to grow around its future BRT lines in an integrated and equitable manner because one entity–the City of Raleigh – controls zoning, roadway design, and transit services. Second, Raleigh offers density bonuses to encourage affordable housing construction, which is an effective workaround to North Carolina's state law which prohibits cities from adopting inclusionary zoning. Before implementing adopting this policy, the city conducted a market study, which involved consulting with local developers to assess construction costs and the demand for various housing types. Third, community engagement has played a critical role in shaping Raleigh's growth strategy. For example, to build public support for affordable housing, transit officials have developed compelling outreach materials that illustrate how the incomes of essential workers (such as teachers, nurses, and law enforcement officers) qualify them for affordable housing.

3.2.9 Salt Lake City

In the Salt Lake City metropolitan area, the Utah Transit Authority (UTA) provides local bus, express bus, BRT, light rail, and streetcar services. In 2014, the agency broke ground on its first joint venture TOD. It also published a set of TOD Design Guidelines for developing TOD sites with private partners. These guidelines include design elements that UTA expects developers to consider and address in their development plans. UTA has three major goals for its TOD program: increase ridership, support a strategy of accommodating 33 percent of the region's future development on just 3 percent of available land, and generate revenue from joint development.

In most cases, UTA's properties are located immediately adjacent to station platforms. UTA works with interested parties around stations to create visions for new development, and then implementation plans to fulfill those visions. If UTA's properties are involved, a joint development partnership may be formed between UTA and private developers.

As of May 2024, 13 TOD projects have been completed or are under construction, with a total of 1,720 dwelling units (126 of which are affordable), along with office, hotel, retail, and commercial uses. The agency still owns more than 2,200 total acres of land near its transit system, of which approximately 100 have been categorized as suitable for future TOD use. Moreover, the region's MPO has developed an interactive map that allows users to examine transportation elements, land use types, economic opportunities, and potential areas for TOD projects.

Like other cases, statewide policy has played a role in UTA's TOD effort. In 2021, the Utah State legislature passed a law that allows cities and counties to establish Housing and Transit Reinvestment Zones. These zones allow jurisdictions to dedicate a portion of tax revenue growth around a transit station for development costs including housing costs, construction, parking development, and land purchases. The Reinvestment Zones program requires that at least 12 percent of residential units be affordable, and an average of at least 50 residential units per acre dedicated to residential use at commuter rail and light rail stations.

Alongside the transit agency and statewide policies, there are various city-wide efforts to facilitate TOD and affordable housing development. In its zoning code, the City of Salt Lake City has established TOD related core and transition areas. Core areas feature comparatively intense land development with a mix of land uses, generally within a one-quarter mile walk of a transit station platform. The core area may mix ground floor retail, office, commercial and residential space. A minimum of 30 dwelling units per acre is encouraged. Transition areas reinforce the viability of the core area and provide opportunities for a range of housing types at different densities. Transition areas are generally located within a one-half mile from the station platform, and the minimum desired density is 10 dwelling units per acre.

The city of Murray, located less than ten miles from Salt Lake City, has three light rail stations that opened in the 1990s and a commuter rail station that opened in 2012. In 2010, the city adopted a mixed-use development district to encourage the development and redevelopment of Murray's core areas into live/work neighborhoods. This area emphasizes pedestrian oriented design by providing amenities such as public open spaces, pedestrian walkways, wide sidewalks, bike lanes, attractive streetscape and transit opportunities. In 2021, it modified its zoning ordinance to further encourage TOD, including creating a zone that allows additional residential density which can be increased if a developer provides affordable housing, mixed housing types, additional commercial space, or project amenities.

The detailed case study describes a 156-housing unit residential development (with 110 affordable units) on UTA-owned lad located near a light rail station. The development, led by a partnership between the Salt Lake County's housing authority and a disabilities advocacy organization, combines community services,

employment opportunities, and community living for individuals with disabilities. Salt Lake City's experience offers three key lessons: First, the importance of creating a holistic station area plan that considers all the aspects of TOD including parking, streetscapes, community needs, and transit connectivity. Second, the need to build strong relationships. For example, UTA coordinates its TOD guidelines with the MPO's long range plan, and prepares station area plans with cities, counties, and developers. Third, when transit agencies, state policies, and municipalities promote TOD, they can help change the perception about where and how the region will grow.

3.2.10 Seattle

Sound Transit, one of the region's transit agencies, has been undertaking one of the nation's most ambitious transit expansion plans in recent years. It operates in a region where the median sales price of an existing single-family home in 2023 was $735,000, compared with the nationwide average of $394,100. Likewise, among more than 350 U.S. metropolitan areas, Seattle has the sixth highest residential rents.

As part of its rail construction projects, the agency acquires land for temporary staging areas. In 2015, the state legislature mandated that the agency prioritize affordable housing when selling its surplus land and contribute $20 million to a revolving loan fund in support of affordable housing related to TOD. In alignment with state law, Sound Transit adopted an 80/80/80 policy, which has three key components. First, subject to certain exemptions, at least 80 percent of surplus properties must be offered first to qualified entities that commit to developing affordable housing. Second, at least 80 percent of the housing units constructed on these sites must be designated as affordable. Third, affordable housing units must be reserved for households earning no more than 80 percent of the area median income.

Through June 2024, Sound Transit has completed or planned TOD projects at 14 stations. A total of 3,473 homes have been built or are in the process, of which 2,673 are affordable. The detailed case study in the appendix describes a TOD project with affordable housing adjacent to a light rail station. After Sound Transit no longer needed a 54,000 square foot property, the agency sold it at a discounted price to an affordable housing developer.

The Seattle case study offers five key lessons for transit agencies pursuing TOD initiatives. First, before issuing RFPs, agency staff engage with local communities to better understand their needs and priorities. As part of the developer selection process, proposals are evaluated not only on their feasibility but also on the benefits they provide to the community. Second, Sound Transit's policy of selling land for either $250,000 total or $1,000 per housing unit—whichever is lower—has proven to be an effective tool in making affordable housing projects financially viable. Third, the State of Washington enhances project feasibility by covering upfront infrastructure costs and ensuring connections to municipal systems. Fourth, while Sound Transit does not have the authority to acquire property specifically for TOD, it strategically considers TOD potential when siting light rail stations and selecting construction staging areas. Fifth, having nine dedicated TOD staff members and clearly defining the TOD roles of relevant departments has enabled the agency to effectively execute its TOD initiatives.

Chapter 4

Action Plans to Promote TOD with Affordable Housing

4.1 Action Plan for Transit Agencies

The case studies and literature review reveal the following 11 recommendations that can help transit agencies and stakeholders use their resources and expertise to promote affordable housing.

1. Understand the problem, challenges and benefits
2. Start planning early for TOD
3. Sites can be transformed after stations have been built
4. Adopt ETOD policies and guidelines
5. Generate public and institutional support
6. Prioritize sites and partner with developers
7. Reassess Parking Needs
8. Take advantage of multiple funding sources
9. Encourage municipalities to **a**dopt local land use changes to promote TOD
10. Review resources and tools
11. Promote new state laws and take advantage of existing ones.

1. Understand the problem, challenges and benefits

Communities across the country are grappling with a widespread shortage of affordable homes. No U.S. city is untouched by the problem, whether its population is small or large, growing or stagnant. A lack of affordable housing even exists in cities, such as Minneapolis, where the number of housing units is growing faster than the population.

Transit officials should learn how their own agencies can benefit from increasing the number of affordable homes near transit stations. TOD residents are far more likely to use transit than residents who live further away from stations, and residents of affordable housing are even more likely to use transit.

In the Bay Area, BART's TOD and affordable housing initiatives have increased transit usage, generated new revenue, and enhanced their relationships with communities. In Austin, the transit agency's support for affordable housing helped it secure funding for building new rail lines. In 2020, voters approved a $7.1 billion transit program which included funding $300 million for "transit-supportive anti-displacement housing strategies."

However, transit agencies also need to recognize the challenge of building more affordable housing near their stations. Agencies must navigate existing local conditions, including those relating to the real estate market, zoning law, construction feasibility, and financial barriers. Cultural and social barriers can also stall progress. CapMetro has found that community resistance can be expected when projects completely change the characteristics of existing neighborhoods.

The stigma associated with affordable housing, which varies from place to place, is an issue that transit agencies need to understand. The following recommendations address this barrier as well as the

administrative, financial, planning, and regulatory barriers that impede the successful implementation of ETOD.

2. Start planning early for TOD

Transit agencies should integrate TOD and affordable housing opportunities into their planning for new and expanded transit lines. Early consideration of TOD ensures that stations and surrounding areas are primed for dense, sustainable development.

Failing to plan for TOD early can create significant obstacles. For example, stations placed without regard to surrounding land use or zoning restrictions may later face barriers to TOD implementation. Similarly, prioritizing construction feasibility or cost reduction over TOD potential can result in poorly located stations, such as those in freeway medians. Both BART and the Metro Transit (in the Twin Cities) learned these lessons since many of their suburban stations, designed primarily for drivers, missed opportunities to create vibrant TOD neighborhoods. Today, both agencies include TOD considerations in their planning for future rail extensions.

To maximize TOD's potential, transit agencies must collaborate with local governments to establish supportive land use regulations (e.g., zoning that allows dense residential developments) and ensure essential infrastructure is in place (e.g., sidewalks, bike lanes, and utilities).

Austin's CapMetro exemplifies this proactive approach by incorporating ETOD planning into its transit expansion program. The transit agency and its partners have taken the time to create a wealth of comprehensive information for government officials, the media, developers, and the general public – before major transit construction was underway. Similarly, although Sound Transit cannot acquire property for TOD, it does consider the potential for TOD when selecting properties that it will use temporarily for construction staging, ensuring these sites can later be transformed into TOD projects.

Proactive TOD planning allows transit agencies to maximize the value of new rail lines, creating neighborhoods that support affordable housing, increase transit ridership, and foster sustainable urban growth.

3. Sites can be transformed after stations have been built

Even after transit projects have been completed, transit agencies can still transform automobile-oriented sites into transit-oriented communities. Transit agencies should prioritize the development of their own underused properties while collaborating with local governments and private property owners.

For example, NJ TRANSIT owns relatively few properties that are ripe for major TOD development. However, the agency still takes a leading role in planning and promoting TOD near its train stations and bus stops. The agency emphasizes collaboration, technical assistance, education, and partnerships with municipalities, as well as supporting land use decisions that improve mobility and access to transit.

In contrast, Denver's RTD owns park-and-ride lots with thousands of underutilized sparking spaces. Although its rail network was mostly built along freight rail corridors and highways, the transit agency is transforming some of its park-and-ride lots into mixed-use developments that serve a growing population, living and working near its stations.

4. Adopt ETOD policies and guidelines

When a transit agency adopts an ETOD/TOD policy, it establishes clear priorities and guidance for the agency staff. It also provides clarity to local governments and developers about the agency's expectations, both on agency property and within the larger station area.

For example, RTD's ETOD policy, adopted by its board, is only two pages long, but provides a clear framework for promoting affordable housing through joint development of RTD-owned property. The policy is intended to increase transit ridership and generate revenue. It encourages the use of a variety of

strategies to spur the development of affordable housing, and sets a non-binding goal for 35 percent of all housing unit on RTD property to be affordable for low-income households.

ETOD policies not only guide development but also spark interest and collaboration with developers. They can enhance a transit agency's reputation among residents and policymakers while empowering TOD advocates within the agency to secure greater support and resources.

Building on these policies, transit agencies should publish guidelines that outline their TOD vision, clarify public and private sector roles, and define design principles and affordability goals. BART's 70-page TOD guidelines serve as a good model, offering detailed sections on TOD expectations, station area planning, the development process, and guidance for developer partners

Well-crafted guidelines also help transit staff understand their own roles by describing the agency's internal processes. For example, RTD lists the roles and responsibilities for the following RTD disciplines: TOD, Real Property, Facilities Maintenance, Rail Operations, Bus Operations, Service Development, Planning, Civil Engineering/ Urban Design, Finance, Legal, and Safety/Security.

5. Generate public and institutional support

Transit agencies must build institutional support (both internally and externally) to successfully promote TOD and affordable housing.

Generating Support at Other Government Agencies

Transit agencies need to develop relationships and coordinate their TOD efforts with numerous government agencies including cities, towns, counties, states, housing authorities, and MPOs. Collaboration is necessary in countless ways, from planning and funding to overcoming engineering and construction obstacles. While city planning staff might support TOD, it is crucial to engage other municipal departments, including those responsible for engineering, fire, and police.

The level of support and engagement will vary within a region. For example, Minneapolis and St. Paul in Minnesota have large professional staffs who do not need as much engagement and support as suburban communities. Transit agency expertise and outreach can help overcome some TOD barriers in the suburbs, such as resistance to higher density development.

The support of local political leadership is critical to successful projects. A transit agency should make sure that political leaders (mayors, city council members, and even state legislators) are aware of projects, their impacts, and funding sources.

Build public interest and support.

Public support is also essential for the success of TOD and affordable housing initiatives. Transit agencies must be prepared to address local concerns, such as traffic and parking impacts. They also need to educate the public about the benefits of transit projects, TOD, and affordable housing.

Huntsville's planners believe they have received widespread support with minimal opposition because of their community engagement efforts. Before going public with potential BRT corridors and TOD sites, the planners identified community needs and talked to potential partners.

An important aspect of public education is dispelling misconceptions about affordable housing. Transit agencies report that many people associate the term "affordable housing" with large urban housing projects built in the 1960s and 70s. But that is far from today's reality. Modern affordable housing projects often resemble market rate homes in both design and amenities.

Promoting affordable housing often involves avoiding terminology that has negative connotations. Instead of the term "affordable housing," some public officials use terms such as "workforce housing." Raleigh explains how affordable housing benefits essential workers by showing the public how the income of local teachers, nurses, and law enforcement workers compares to the area's median income.

In some instances, officials have met resistance to the term affordable housing because of a concern about property values. To avoid those concerns, officials can point to studies that indicate property values do not negatively affect the values of surrounding properties.

Building Support within Transit Agency

Transit agencies need to build internal support by educating their own staff about TOD and affordable housing. TOD issues span numerous agency departments, including these responsible for real estate, planning, government relations, engineering, capital programs, stations, safety, operations, and maintenance. Staff should understand the features and benefits of TOD, and how their roles contribute to its success.

To facilitate both internal and external coordination, transit agencies should hire planners who have expertise in land use policy and strong interpersonal skills. They can help work with communities, develop partnerships, and encourage land use decisions that promote TOD (such as reducing parking requirements). They also can help other departments within the agency address TOD-related issues.

Sound Transit has nine staff members dedicated to TOD projects, and by clearly identifying the roles of relevant departments, the agency has successfully delivered TOD projects.

In Denver, TOD staff have broken down silos within their transit agencies, through both informal and formal ways, such as attending meetings and social events, and developing educational materials.

6. Prioritize sites and partner with developers

Prioritizing Sites

A region may have hundreds, if not thousands, of potential TOD sites. Transit agencies need to prioritize which sites to focus on by considering factors such as real estate market conditions, local support, existing zoning, and infrastructure readiness. For instance, BART prioritizes area that have adopted plans and zoning that support TOD, where infrastructure barriers are minimal, market readiness is evident, and development potential is high.

Publicly owned land presents a particularly valuable opportunity. Chicago has found that TOD plans for publicly owned properties are more likely to be successfully implemented than those relying on owners of privately owned properties.

Agencies should clearly define and share the processes that it uses to select sites and enter into development projects with its partners. This includes collaborating with jurisdictions and communities to set goals and objectives (such as the percentage of housing units that will be designated affordable). Other steps include undertaking a development feasibility study and conducting a parking needs analysis.

Agencies typically initiate competitive processes to select a site developer. For example, prior to issuing RFQs and RFPs to develop its properties, Sound Transit engages with communities to understand their needs and desires. The agency then evaluates proposals, in part, by the benefits they bring to the community.

Agencies should not focus too narrowly on a single site. They need to ensure that developments integrate into transit oriented communities, where pedestrians and bicyclists feel safe, and automobile use is minimized.

Selling / leasing transit agency properties

Many agencies (such as BART and CapMetro), prefer entering into long-term ground leases for TOD projects, rather than selling their properties. Leasing offers a number of benefits. It provides a steady revenue stream; gives agencies greater control over the use of the property, ensures the development aligns with the agency's goals, and offers flexibility for future transit needs.

Transit agencies cannot easily support affordable housing, if they are required to sell or lease land at market values. Offering land discounts for affordable housing can be in a transit agency's best interests because these projects may generate more ridership than market rate homes. For example, BART may discount land by up to 60 percent, depending on the number of units and level of affordability that is

provided. Likewise, Sound Transit sells its property for only $250,000 or $1,000 per housing unit, whichever is less. This has proven to be an important strategy in making affordable housing projects financially viable.

Keep in mind that a transit agency may need to obtain FTA's approval before selling or leasing any property purchased with federal funds. Relevant regulations are defined in FTA Circulars 7050.1C and 5010.1D.

Partnering with developers

Transit agencies need to clearly articulate their goals, so developers building affordable housing understand how best to respond to TOD opportunities. Sound Transit, for examples, tries to clearly articulate and prioritize its goals so that proposers of projects are not guessing the agency's preferences. The agency also tries to be clear about challenges. Sound Transit has found that developers can submit better proposals when they have more information.

A transit agency can prioritize affordable housing projects by expediting internal reviews, and waiving processing and development review fees. They can also support affordable housing developers in securing entitlements and grants.

Transit agencies should be open to adjusting policies to account for changing market conditions. For instance, while retail spaces are important elements of successful TOD projects, strict requirements for retail uses may make obtaining financing projects more difficult. One option is to reorient spaces around other needs, such as afterschool programs or medical uses. Sound Transit, for example, encourages some developers to build space for small businesses, and provide other kinds of commercial spaces such as medical offices.

7. Reassess Parking Needs

In the face of changing travel patterns, transit agencies need to evaluate the number of parking spaces needed at transit stations, and work with local officials on parking requirements for nearby developments.

Parking at Transit Stations

Many transit agencies are rethinking their need for large commuter parking lots and have come to realize that transforming excess parking into residential development can attract more riders. Agencies are also considering swapping some of their properties with other landowners to ensure that the most appealing properties are made available for development.

Parking fees often provide significant revenue for transit agencies. To assess TOD options, BART uses a parking replacement model to measure the ridership and revenue impacts of reducing parking spaces. Not all agencies factor parking revenue into their TOD evaluations. For example, RTD's revenue loss from eliminating parking is minimal because vehicles registered within RTD's boundaries can park for free at nearly all of its parking lots for up to 24 hours.

Metra's planners carefully consider whether a TOD proposal will negatively affect riders and ridership levels. They do so by assessing whether reductions in parking capacity will meet long-term demand, and if stations can accommodate the variety of ways that passengers access stations (e.g., rides from family members, ridesharing services, local buses, walking, bicycling.) Minimizing total travel times for commuters is a critical issue for them, especially when a parking deck replaces a surface lot. For instance, if Metra passengers must park on the upper level of a parking deck located three blocks from a station, they might be deterred from traveling by train.

Local Parking Requirements

Transit agencies should encourage municipal governments to consider reducing or eliminating minimum car parking requirements for developments near transit stations. This approach can lower the cost of constructing new housing and promote transit use. If cities conduct parking surveys to determine the use of

parking spaces at existing residential developments near station areas, they may be more likely to reduce the parking space requirements for affordable housing.

Cities such as Austin, Chicago, and Minneapolis have already eliminated certain minimum off-street parking requirements near transit stations to reduce housing costs and promote walking, bicycling and transit. According to Austin city officials, "minimum parking requirements have resulted in an overabundance of parking in many locations throughout Austin and have continued to encourage people to drive to their destination. These parking spaces are expensive to build and maintain, and promote automobile use even when short trips can be easily accessed by walking, bicycling, or by taking transit."

As noted in the literature review, developers are typically required to predict the impact of their projects on local traffic flows and parking. Cities and transit agencies should not require developers to use models that rely on nationwide samples of observed travel behaviors. Instead, models should be tailored to reflect TOD environments that are designed to encourage walking, biking, and transit use.

8. Take advantage of multiple funding sources

Transit agencies should be aware of various funding sources available to support affordable housing. As noted in the San Francisco case study, a non-profit organization relied upon nine different sources of funding to build affordable units on BART property.

Several funding sources can kickstart planning studies. For instance, the FTA's Pilot Program for TOD Planning provides funding for transit agencies and local officials to develop TOD plans. Chicago's regional transit authority and counties in Minnesota also offer planning grants to conduct studies and develop plans. Even relatively small grants (e.g., less than $100,000) have inspired municipalities to pursue TOD projects,

Federal, state, and local programs also directly subsidize housing construction costs. The largest federal program promoting affordable rental housing is the Low-Income Housing Tax Credit. Other funding sources can pay for specific aspects of construction that make affordable housing projects more viable. For example, the State of Washington has a program that covers upfront infrastructure costs and connects housing to municipal utilities.

In some regions, such as the Bay Area, affordable housing projects may be easier to finance than market rate housing. Rising construction costs, relatively high interest rates, and sluggish rents can make it difficult for market rate developers to move forward with their projects. In contrast, the availability of state and local affordable housing funds enables affordable housing projects to advance.

9. Encourage municipalities to adopt local land use changes to promote TOD

Transit agencies should encourage municipalities to adopt local zoning changes that support TOD. When municipalities allow TOD "as-of-right", the development process is faster and less likely to stall because of community opposition. A project is considered "as-of-right" when the zoning ordinance specifically permits the proposed use without the imposition of special conditions or the necessity of discretionary approval from a local zoning board or commission. When as-of-right zoning for TOD is in place, developers are more likely to obtain necessary approvals, secure financing, and pay up-front costs.

Some cities have inclusionary zoning programs which requires developers to sell or rent a certain percentage of new residential units to lower-income residents. In states that prohibit inclusionary zoning (e.g., North Carolina), cities can get around that restriction by offering density bonuses for affordable housing construction.

10. Review resources and tools

This document highlights a range of useful resources and innovative tools including policies, plans, procedures, accomplishments, and guides. Several cities have interactive mapping tools that allow users to better understand the relationship between TOD, transportation networks, and land uses in their communities. Some of the notable resources and tools are:

- Austin's interactive tool helps users understand the character and trends of growth.
- BART's framework for determining its financial return from affordable housing
- Twin Cities' tool that categorizes TOD station areas and provides policies for TOD implementation.
- NJ TRANSIT's data application allows users to map out TOD elements.
- Raleigh's interactive map shows the location of transit overlay districts.
- Denver's parking guide principles and a tool analyzes property data on all multifamily and commercial properties within a half mile of stations.
- Sound Transit's policy on disposing of excess real estate.
- NJ TRANSIT''s guide with a seven page list of sources that can help fund the planning, designing and construction of TOD projects.

11. **Promote new state laws and take advantage of existing ones.**

State laws can serve as powerful tools to promote TOD and affordable housing. Transit agencies can advocate for new laws and take advantage of existing ones. States in the case studies are implementing rules that promote affordable housing near transit stations. For example:

- Colorado mandates local governments adopt zoning near certain rail stations that allows for approximately 40 residential units per acre.
- In New Jersey, all municipalities are required to provide their share of affordable housing, and the state offers incentives to build TOD projects.
- The state of California ties local housing plans to state funding, and requires certain local jurisdictions in the Bay Area to adopt TOD-compatible zoning ordinances.
- In Washington, Sound Transit is required to make most of its surplus property available for affordable housing.

4.2 Action Plan for State and Local Governments

The case studies and literature review point to a variety of potential mechanisms by which state and local governments can collaborate with transit agencies to ensure better planning for affordable TOD. In this section, we point to several key policy approaches that these general-purpose governments can undertake to achieve, first, to improve the provision of affordable housing in areas located adjacent to transit, and second, to ensure adequate public transportation options for people who live in existing affordable housing.

The variety of policy approaches to which we point here reflect the fact that local and regional affordable TOD efforts may best be advanced when linked to other initiatives. Research from Kralovich (2012) concludes that pooled advocacy power and funding opportunities across policies related to health, equity, and economic development could raise the tides for each. This work further suggests that local and regional authorities could better achieve affordability in transit-rich areas if they enforced rent control or stabilization ordinances. Put succinctly, they note, that affordable housing initiatives should be combined with efforts to prevent illegal evictions and condo conversions, which may reduce the availability of housing for households with low and moderate incomes.

Moreover, we caution that securing affordability near transit in the near term, such as through the creation of new affordable units does not ensure long-term affordability in the absence of contract-binding policies. In the absence of regulation, Thomas and Bartolini (2017) find that such long-term affordability is better maintained during periods of political stability at the national level, in the context of transparent and amicable relationships between actors in the region (which can mean across state lines), cross-jurisdictional teams to implement TOD, and public participation in the urban design and commercial programming. Relatedly, Hersey and Spotts (2015) offer examples of success in equitable TOD funding expansion through

systems of local matching of state awards, such as Denver's matching of awards from the Colorado Housing Finance Authority.

Moreover, the policies described below reflect that multiple levels of government can play an important role in making the connection between transit and affordable housing. This would reflect a change from approaches today. Historically, measures for affordability as it relates to transit access have been less plentiful at the state-level than at the local level; the majority of regulatory and incentive-based interventions in support of affordable TOD are undertaken by city and county governments. In a study of 107 TODs between 1992 and 2021 across 24 different regions, only two had leveraged state-level affordable housing measures applicable to TODs, and those that existed had limited impact (Kaniewska et al. 2024). Furthermore, most state affordability-related policies are voluntary. These findings suggest a need for more housing affordability supported at the state level, mandatory regulations rather than incentive policy structures, and the creation of enforcement systems for affordability regulations.

Below, we detail key approaches that could be helpful for state and local governments to consider as they advance more affordable TOD.

4.2.1 Opportunities for action by both state and local governments

1. **Expand investment in affordable housing to better meet the needs of families with low and moderate incomes.**

The federal government currently provides support for affordable housing investment through a variety of programs, but those programs only serve about a third of families who would otherwise be eligible based on their incomes. State and local governments can help make up the gap by expanding investment in affordable housing units. Several states and localities have done so in recent years through the introduction of new affordable housing funding mechanisms. For example, in 2024, Charlotte, North Carolina voters passed a $100 million bond to fund such units; voters in the state of Rhode Island passed a $120 million bond to do the same (Cooperman and Harrison 2024). In 2020, Austin, Texas voters agreed to fund $300 million in affordable housing strategies, with a special emphasis on activities meant to combat displacement, as a component of the city's transit referendum.[i] These funds can be directed to affordable housing projects located in areas close to public transportation stops.

2. **Expand investment in public transportation options specifically designed to improve service to areas with high levels of affordable housing.**

Both state and local governments can increase their support for public transportation through grants and other sources of revenues provided to public transit agencies. This increase in investment can be used to increase service quality (e.g., by running more frequent buses) or creating new lines (e.g., by building a new bus rapid transit route). In any case, state and local governments can condition their assistance on the assurance that transit agencies support routes specifically designed to expand access to residents of existing affordable housing or collaborate with affordable housing providers to implement new routes to areas where additional affordable housing is planned.

3. **Leverage acquisition powers to purchase land adjacent to transit services, particularly new transit investments, and use that land to support affordable and social housing projects.**

One major obstacle for the provision of increased affordable housing near transit is the high cost of land adjacent to stations (Hickey and Sturtevant 2015). This can make the development of affordable units require a high level of subsidy, which can, in turn, limit the number of affordable housing units built. Both states and localities can leverage general purpose and community development funds to purchase

land in areas adjacent to transit stations with the intention of using it for the future affordable housing. Particularly valuable land for this purpose is either vacant or being used for automobile-oriented uses, such as strip malls. This land can be transferred to public housing authorities or nonprofit housing developers to reduce their overall cost of development and enable additional affordable housing development.

4. **Continuously monitor conditions on the ground to identify the degree to which the public transportation system is meeting the needs of residents, particularly those living in affordable housing.**

States and localities should set out metrics to evaluate the degree to which its residents have access to public transportation service. They should be particularly focused on evaluating whether the transit system is designed to ensure lower costs of living for people with low and moderate incomes. One mechanism to do so is to continuously monitor the location of affordable housing units and assess the degree to which they are located in areas with easy access to transit. This information can play an important role in expanding the research on the link between transportation and affordable housing investments throughout the United States.

4.2.2 Opportunities for action by state governments

1. **Implement requirements for metropolitan planning organizations (MPOs) to coordinate transportation investment with patterns of local housing.**

State governments oversee MPOs, in part through state laws that define what actions MPOs should take beyond those that are required by the US Department of Transportation. States should consider implementing requirements for MPOs to coordinate transportation investments with patterns of local land use and housing to ensure the maximum effectiveness of the transportation system while reducing costs of living. The 2021 Infrastructure Investment and Jobs Act encouraged MPOs to include such Housing Coordination Plans as part of their federally required long-term transportation plans, but the federal government does not require coordination.[ii] Such coordinated planning could include, for example, a commitment that new transportation investments are only targeted for parts of a metropolitan area with adequate housing density, particularly of affordable units. MPOs could also be mandated to monitor the degree to which local governments are compliant with the goal of achieving additional housing supply. For example, MPOs could limit investment in jurisdictions that have not met the goal of providing a minimum level of new affordable housing. Some MPOs, such as the Central Shenandoah Planning District Commission (2025), are already beginning to study how housing trends are related to access to transportation.

2. **Ensure that scoring criteria for the Low Income Housing Tax Credit (LIHTC) prioritize applicants proposing projects located near effective public transportation services.**

State governments (and a small number of localities, including the cities of Chicago and New York) manage the distribution of LIHTC credits, which are the primary source of federal subsidy for the provision of new affordable housing units in the United States. States can use the application scoring system for these LIHTC units, defined in their Qualified Allocation Plans, to prioritize projects located in areas adjacent to effect transit services (Nedwick and Burnett 2015). Connecticut, for example, provides developers proposing projects extra credit if the project is in a location that would have good access to job centers (Ellen et al. 2015). This can result in a direct effort to link the provision of housing units affordable for people with low and moderate incomes to locations near transit, where those residents can also benefit from affordable public transportation options.

Wanting to get the most out of existing federal programs, some scholars have explored ways to improve the LIHTC program. They find that use of the basis boost (a tool for improving the financial feasibility of developments with higher-than-average costs) to support developments near transit is uncommon. They recommend that housing agencies, which have the discretion to increase a development's eligible basis by up to 30 percent, expand the use of this option and therefore enable more equity to be raised than would have been possible without the boost and reducing the amount of debt and gap funding needed (Shelburne 2011). Others advise that housing agencies more stringently limit the number of points developments can receive for cost efficiency when determining LIHTC allocations, so as to not excessively overshadow other important policy priorities (Nedwick and Burnett 2015).

Other initiatives can also support state investment in both affordable housing and transit. Take, for example, the California Greenhouse Gas Reduction Fund, which raises revenues from state cap-and-trade auctions to fund the Affordable Housing and Sustainable Communities Program, which in turn prioritizes producing and preserving affordable housing near transit (Boarnet et al. 2017). Other states (e.g. Massachusetts and Colorado) have successfully leveraged widespread public support for environmental sustainability as a way to fund transit infrastructure, service, use, and transit-oriented development (Freemark and Rennert 2023).

3. **Flex funds from the Federal Highway Administration to transit investments, and leverage CMAQ funding to support affordable TOD.**

All states and their sub-entities receive considerably more funding from the Federal Highway Administration than the Federal Transit Administration. Large federal highway programs including the National Highway Performance Program and the Surface Transportation Block Grant. In both cases, federal law enables states to "flex" funding from most highway program to transit purposes (Freemark and Rennert 2023). This can be undertaken in two ways. In some cases, funds from the programs can be used directly on transit projects, as long as those projects are located in federally defined highway corridors. In other cases, state departments of transportation can request that funds be moved into transit accounts for the general use of transit agencies. In both cases, state agencies can encourage that funding to be used for transit investments that would, in particular, benefit residents of affordable housing.

States also have the opportunity to directly invest their federal Congestion Mitigation and Air Quality grant funding to TOD projects with a focus on affordable housing (Freemark 2024). This funding has been previously used to support development projects that, in association with effective transportation investments, can demonstrate a clear link to improved air quality. These funds have been used, for example, for the construction of the Atlantic Station project in Atlanta, Georgia,[iii] which demonstrated that its future residents and workers would drive less than those working in similar complexes elsewhere in the region.

4.2.3 Opportunities for action by local governments

1. **Concentrate investment in affordable housing, including for individual households, in neighborhoods located adjacent to transit services, particularly in areas near fixed-guideway stations, where possible.**

Local public housing authorities have considerable discretion over how to use funding from a variety of sources, including federal Section 8 and HOME funds. These authorities can concentrate their investment in such units in neighborhoods located near effective transit services, so as to ensure that affordable

housing residents are able to benefit from the cost savings inherent in being able to take public transportation to get around.

One particularly interesting opportunity to do so is through the use of social housing programs, which are now being piloted in jurisdictions such as Atlanta, Georgia and Montgomery County, Maryland.[iv] These programs enable cities and housing authorities to leverage their public land ownership as an equity contribution to new development. This contribution can create a permanent source of revenue that, in the context of mixed-income developments, can help subsidize units affordable for people with low and moderate incomes. Jurisdictions should consider implementing such programs in locations close to transit stations.

Local housing authorities may also consider encouraging residents who use federally assisted Housing Choice Vouchers to try to rent out units in locations adjacent to transit. This can help reduce overall costs of living for residents. Housing authorities can ease this process by providing residents information about transit access from potential rental locations, such as in the form of Transit Scores,[v] and prioritizing providing vouchers to residents who are planning to rent in such areas.

2. **Ensure that local land-use and zoning policies enable the construction of dense housing in neighborhoods around transit services.**

In order to ensure that affordable housing can be planned as part of TOD projects, local land-use and zoning policies must make it possible to build dense development in areas near transit. At the moment, subsidized housing in many regions is concentrated in very small areas because of restrictive zoning (Freemark 2023). Local governments should consider revising their codes so that affordable housing is possible in many neighborhoods near transit, and so that everyone is able to take advantage of transit. This connection is important because the more people who are living and working near transit, the more people are actually likely to take advantage of transit services.

3. **Invest in streetscape improvements on local streets that prioritize pedestrians and cyclists to ensure connectivity between residential areas and transit services.**

Evidence shows that people who live and work near transit are more likely to do so if the neighborhoods around stations are walkable. Localities should invest in improved sidewalks and cycling facilities in these neighborhoods to connect residents and workers to transit stations. One potentially valuable source of resources for this type of investment is the federal Community Development Block Grant program, which can be used by localities to invest in physical infrastructure in historically underinvested neighborhoods.

4. **Provide protections to low- and moderate-income renters in neighborhoods adjacent to new transit projects to ensure they can remain in place.**

Though transit investments are not always—or even mostly—associated with gentrification and displacement in the surrounding neighborhoods, some new transit projects do result in rising costs for new home purchases and rents. This can have the ultimate impact of making it more difficult for people with low and moderate incomes to be able to afford to live in particular areas. Localities should consider implementing regulations such as rent stabilization that are designed to limit the effects of those cost increases on the most vulnerable residents. These policies should be implemented carefully, however, to ensure that they do not prevent the construction of other new housing.

[i] City of Austin. Project Connect Anti-Displacement Initiatives. Accessed January 31, 2025. https://www.austintexas.gov/department/project-connect-anti-displacement-initiatives
[ii] US Department of Transportation. Housing in Transportation Planning. Accessed January 31, 2025. https://www.planning.dot.gov/planning/topic_housing.aspx
[iii] US Environmental Protection Agency. Atlantic Station (Atlantic Steel Site Redevelopment Project). Accessed January 31, 2025. https://www.epa.gov/smartgrowth/atlantic-station-atlantic-steel-site-redevelopment-project
[iv] Housing Production: Mixed-Income Public Development. Center for Public Enterprise. Accessed January 31, 2025. https://publicenterprise.org/housing/
[v] Transit Score Methodology. Accessed January 31, 2025. https://www.walkscore.com/transit-score-methodology.shtml

Table 4-1. Best practices for government actors seeking to incorporate affordability into TOD

Study	Geography and period	Method	Finding
Federal level efforts. Synthesis finding: To date, access to LIHTC support is the most widely used federal strategy for facilitating affordable housing creation near transit. Still, it remains underutilized.			
FTA Pilot Program for TOD Planning (Federal Transit Administration 2024)	Nationwide, updated in 2023	FY2023 awards entailed $17.6 million awarded as 100% federal support to 20 projects in 16 states.	FTA established the opportunity to receive full federal support for projects that focus on connecting affordable housing and transit. Projects could focus, among other things, reducing regulatory barriers to affordability, updating parking standards, and providing strategies to address homelessness.
Nedwick and Burnett 2015	15 U.S. states between 2003 and 2013	Interviews with over 100 housing policy makers, developers, and transit policy experts. Hedonic regression of 'incentive' policies modeled against affordable units.	Authors focus on the federal Low-Income Housing Tax Credit program. They recommend balancing cost containment in the LIHTC Program so that higher cost developments are not put at a disadvantage. Policies like caps on development costs and incentives for cost efficiencies can make it difficult for transit-oriented developments to compete for 9% LIHTCs.
Shelburne 2011	Nationwide, 2008 to 2011	Landscape analysis of all 50 states' application of LIHTC programming, and review of plans.	Looks at the ways that some states have used the LIHTC basis boost for transit-proximate developments. Authors identify basis boost as a tool for improving the financial feasibility of developments with higher-than-average costs (which is typically the condition of TOD sites). Housing agencies have the option to increase a development's eligible basis by up to 30 percent, enabling the developer to raise more equity than would have been possible without the boost.
State level efforts. Synthesis finding: State-level measures for affordability as it relates to transit access are not particularly common, but those that exist and have impact are intertwined with other initiatives (e.g. environmental sustainability).			
Boarnet et al. 2017	Greater Los Angeles metro area, policies in place at time of writing (2016-2017)	Policy review, landscape analysis.	Authors note the effectiveness of combining funding strategies for affordable housing in TOD with environmental goals. Example of California Greenhouse Gas Reduction Fund— revenues from state cap and trade auctions, funds Affordable Housing and Sustainable Communities Program— is discussed. This fund explicitly prioritizes producing and preserving affordable housing near transit.

Study	Geography and period	Method	Finding
Hersey and Spotts 2015	Nationwide from roughly 2005 to 2015	Landscape analysis of practices.	eTOD fund created by Colorado Housing and Finance Authority in 2010. Denver contributed $2.5 million in top-loss capital. Funded totaled $15 million. In 2014, that fund expanded to $24 million for non- and for-profit development to be used across a seven-county metro region.
Thomas and Bartolini 2017	11 case studies from multiple countries	Meta-analysis.	Find that political stability at the national level, relationships between actors in the region, interdisciplinary teams used to implement TOD, and public participation are the most significant success factors in TOD implementation.
Kaniewska et al. 2024	107 TOD projects across 24 rail-served regions across the US, 1992 to 2021	Landscape analysis using interviews, housing price data via web-scraping, use of HUD-published AMIs, and review of development plans.	Find that the overwhelming majority of regulatory and incentive-based interventions in support of affordable TOD exist at the city and county levels. Of the 24 regions studied, only 2 have state-level affordable housing measures. Authors also critique the voluntary nature of many approaches to creating affordability. However, they find that few regulatory measures are actually enforced. Making a larger share of total affordable TOD units the result of voluntary measures.
Local and regional level efforts			
Parkhurst 2012	San Francisco and Denver, 1930s to 2010	Landscape analysis, historical contextualization, and case studies.	Author stress funding via public-private partnership. Highlights the $50 million Bay Area Transit-Oriented Affordable Housing Fund and the $15 million Denver TOD Fund designed to assist low-income families reduce their transportation costs. Argues that the success of these efforts was associated with their work with CDFIs.
Sandoval 2016	Two TODs in Boyle Heights neighborhood in Los Angeles looking at neighborhood data from 1990 to 2015	Comparative case study analysis and interviewees with TOD neighborhood residents.	Concludes that TODs most effectively meet the objectives of eTOD when the development process features the inclusion of existing communities in a culturally competent way that includes community decision-making in placemaking project elements.
Bodaken and Nedwick 2012	Denver, CO, Seattle, WA, Washington DC, and Atlanta, GA (2009 to 2012)	Case studies.	Stresses the underutilization of preservation funds for affordable TOD facilitation. Cites Green Preservation of Affordable Transit-Oriented Housing (GreenPATH) in DC as a successful example of this application.
Quigley 2010	Atlanta, GA, Denver, CO, Seattle, WA, and Washington DC from 2000 to 2010	Case studies.	Author highlights strategies successfully used across the case study cities including: CDCs and tenant organizations utilizing pooled financing; cities utilizing Land Banking Authorities to hold a manage land or buildings for non-profits and government agencies for up to five years tax free with the option to clear delinquent taxes; utilizing Neighborhood Stabilization Programming specifically for the preservation of multi-family housing in transit corridors.
Kralovich 2012	Oakland, CA, Los Angeles, CA, and Denver, CO pulling examples from 2000 to 2012	Case studies.	Link equitable TOD efforts with other citywide and regional equity initiatives; TOD overlay zones allow for much needed zoning flexibility to better match the unique needs and behaviors of transit-proximate residents; consider housing TOD funds at the country-level as it better aligns with the scale of impact of the transit system; enforcement of rent stabilization ordinances where they exist/apply.

4.2.4 Leveraging Federal Support

The federal government requires jurisdictions that receive funding (generally states, localities, and governmental agencies) to develop plans, many of which demonstrate policymakers' interest in, if not

commitment to, supporting affordable housing in areas of high transportation accessibility. Examples of such plans include U.S. DOT-mandated Long-Range Transportation Plans and Transportation Improvement Programs; Federal Transit Administration (FTA)-required Coordinated Public Transit-Human Services Plans; HUD-required Consolidated Plans, Action Plans, Public Housing Authority Plans; and Internal Revenue Service-required Qualified Allocation Plans (for LIHTC allocations). In guidance for developing these plans, the federal government sometimes states interest in promoting TOD principles. That emphasis, according to Boarnet et al. (2017), often takes the form of "prioritizing," "encouraging," "facilitating," "capacity building," and "supporting" public and private stakeholders. Because of the lack of benchmarking associated with these, it is difficult to say the degree to which they have successfully manifested in affordable TOD; the "support" provided by these programs may be insufficient to incentivize affordability in areas whose value has been increased by transit proximity.

The FTA Pilot Program for TOD Planning, updated in 2023, has a more clearly defined commitment to these outcomes. The program establishes the opportunity to receive full federal planning funding for projects that focus on connecting affordable housing and transit. Projects can center, among other things, reducing regulatory barriers to affordability, updating parking standards, and providing strategies to address homelessness. In fiscal year 2023, this program awarded $17.6 million in the form of 100 percent federal support to 20 projects in 16 states. Though it is too early to determine the extent to which this planning support secures affordability, this program is promising.

The federal government has also established new principles for supporting the development of affordable housing projects in areas directly adjacent to transit stations (González-Hermoso and Freemark 2023). The FTA's interim asset disposition guidance allows transit agencies to transfer surplus property purchased with federal funds to municipalities or nonprofit developers at no cost if that land is used for affordable housing (rules require at least 40 percent of units to be below 60 percent of AMI, or 20 percent below 30 percent of AMI). Meanwhile, the federal government's RRIF and TIFIA programs have been altered to encourage the distribution of low-cost loans to TOD projects.

Cities and states should maximize their efforts to leverage federal programs and policies to support affordable housing in areas near transit. These programs can also assist them in using the investments represented by public transportation systems to support better affordable housing access.

4.3 Recommendations for Researchers, Modelers, and Analysts

Transportation impact analyses can be powerful planning tools in advancing affordability. Unfortunately, inaccurate modelling techniques can make integration and preservation of affordability a challenge. As part of the planning approval process, developers are typically required to predict the impact that a project will have on local traffic flows and parking needs. These impacts then need to be mitigated by the developers, which can take the form of actions like building additional parking, adding travel lanes, and paying impact fees to the municipality to support their expansion of transportation network capacity to accommodate these impacts. To determine transportation impacts, the most commonly used modelling technique involves the use of the Institute of Transportation Engineers (ITE) trip generation and parking generation manuals. These models have been calibrated using a nationwide sample of observed travel behaviors. When applied to walkable, bikeable, or transit-rich areas, this calibration places an overemphasis on the travel-influences factors present in car-dominant, non-urban built environments (Handy 2015; Millard-Ball 2015).

Testing the magnitude of this misalignment of model assumptions to TOD environments specifically, Millard-Ball (2015) compare household travel surveys with ITE predictions and find that modelling using the ITE trip generation approach overestimates total automobile trips associated with TODs by 55 percent. The study suggests that this is due, in part, to the fact that ITE modelling fails to account for the fact that new developments do not directly generate all new trips. Rather they incite trip shifts or reshuffling from one destination to another, often nearby. Authors of this study stress the import of this overestimation, as it results in TODs incurring excessive impact fees stifling affordability feasibility.

In their evaluation of ITE accuracy, Ewing et al. (2017) similarly find that peak parking demand among TODs is less than one half the parking supply guideline in the ITE Parking Generation manual, and that observed total TOD vehicle trips sit at just half of what the ITE Trip Generation manual predicts. Because of this, authors suggest that one way to better integrate affordability into TODs could be to build on parking lots and other space otherwise allocated for parking.

Fortunately, these modeling approaches can be altered. Scholars have proposed some improved modelling practices by testing them against the most commonly used techniques. Those seeking to operationalize best practices may want to turn to these approaches. For example, Clifton et al. (2013) suggests that ITE standards need not be done away with entirely. Rather, accuracy could be improved with more case-specific adjustments to underlying assumptions. This research team proposes that a combination of observed person and vehicle counts and intercept surveys specific to existing TODs be used to recalibrate trip and parking generation models for future TODs.

Others committed to the value that modelling could have in securing affordability in TODs but dissatisfied with widely used techniques in the current practice have focused on emphasizing calculations of access to opportunity rather than trip generation and parking need. Some affordable housing organizations use quantitative scores that include transit access measures to inform decision-making of their funding awards, for example. This is a wise choice, as accessibility via sustainable modes has a direct impact on cost of living and quality of life (Talmage and Frederick 2019). However, there remains an opportunity for improvement in this work as well. Smith et al. (2021) find that more comprehensive methods, like the Transit Opportunity Index (TOI) approach, showed improvements over more commonly used transit proximity measures in calculating household living costs and ability to cover them. Several scholars have recommended that policymakers not only use quantitative transit accessibility scoring to a greater extent in their funding award choices, but that they use the TOI to focus on keeping both mobility and housing costs down.

Table 4-2. Recommended improvements in modelling techniques

Study	Geography and period	Method	Finding
Improvements in modelling techniques. Synthesis finding: Current modelling techniques are inaccurately predicting transportation impacts, resulting in greater financial barriers to affordability. However, options of better techniques exist.			
Clifton et al. 2013	US nationwide, 2013	ITE prediction modelling compared to raw counts and design of recalibrated prediction model.	Authors call for changes to travel behavior modelling. Proposes that a combination of observed person and vehicle counts and intercepts surveys specific to existing TODs be used to recalibrate trip and parking generation models for future TODs.
Millard-Ball 2015	Nationwide, 2009	Comparison of household travel surveys and ITE trip generation manual outputs.	Find that ITE trip generation approach overestimates total trips by 55% and fails to account for the fact that new development does not directly generate all new trips. Rather it incites trip shifts/reshuffling from one destination to another. TODs, as a result, incur excessive impact fees stifling affordability feasibility.
Dawkins and Moeckel 2016	Washington DC and Baltimore metro areas, modelled from 2000 to 2012 and then projected from 2013 to 2040	SILO mode using 2007-08 Travel Survey datal: discrete-choice microsimulation model of individual and household level housing selection.	Uses a model to estimate how different policies that impose affordability restrictions on new dwellings in transit areas are associated with increased housing affordability and reducing gentrification resulting from transit. Finds that supply-side affordability requirements for new construction have the largest impact on the sorting of low-income households near transit, while demand-side housing

Study	Geography and period	Method	Finding
			vouchers but they do not help low-income households move closer to transit.
Smith et al. 2021	Greater Hartford, CT	Compares Transit Opportunity Index (TOI) approach to transit access measurement to other approaches more commonly used by Housing Authorities.	More comprehensive methods, like the TOI approach, showed improvements over more commonly used transit access measures. Authors recommended that affordable housing-involved agencies not only use quantitative transit access scoring to a greater extent in their funding awarding determinations, but that they use the TOI to do so most accurately.
Ewing et al. 2017	Five case study TODs across the country; data collected in 2015	ITE prediction modelling compared to raw counts.	Find that peak parking demand TODs is less than one half the parking supply guideline in the ITE Parking Generation manual, and total vehicle trips sit at just half of what the ITE Trip Generation manual predicts. Because of this, one way to integrate affordability into TODs (planned and already existing) could be to build on parking lots and other parking-allocated space. Functionally a density bones of sorts.

4.4 Future Research Needs

Though the landscape of research at the intersection of affordable housing and transit is arguable rich in depth and extensive in volume, there is always room for further growth in our understanding of the subject, and therefore also of the research that facilitates that understanding.

4.4.1 Greater variation in context

As previous noted, most analysis of the relationship between affordable housing and transit centers rail and dense urban environments. There would unquestionable be value in varying both of these contextual elements. In fact, fewer than half of the nation's transit agencies provide rail services of any type. By far, buses are the most widely spread mode of transit service across the US. Because of this, research that focuses on how bus service can be better deployed to serve residents of affordable house or on how affordable housing can be better developed to encourage transit sue and facilitate comfortable transit connections, should be given great priority in the field going forward.

Additionally, there is little known specifically about the effectiveness, or best strategies associate with, microtransit in this body of literature. Have some agencies found that tailoring microtransit to the travel needs of affordable housing residents has been successful at improving the travel experience and accessibility conditions of those individuals? Has it been cost-effective? Do residents prefer it? Knowledge gaps in this area are many in number, so future research may want to employ itself in the shrinking of those.

Finally, as a growing share of affordable housing becomes located in suburban areas, there is a more pressing need than ever for research that concentrates on how residents of affordable housing and high-quality transit services can best be connected in these build environment conditions.

4.4.2 Different Funding Models

Both the financing of transit service and financing of housing in the US is, when compared globally, arguable highly limited and fairly homogenous. While much attention has been paid in research to the different ways that US agencies and municipalities currently fund, and previously have funded, both transit services and affordable housing, these are not the only methods of either that exist. Turning further afield could offer new insight. Future research could run an international comparison in funding models at the intersection of these two elements (transportation and low-income housing) against a set of outcome metrics that US providers are greatly interested in. These could include, for example, magnitude of service afforded, speed of funding securing, resident satisfaction, burden on society (e.g. the tax-paying public, employers, local gov., federal/national gov.) equity conditions of funding structure (e.g. regressive, proportionate,

progressive), sustainability of funding structure/source, and more. Future research that adopts a global lens when looking at these realities may have much to offer US providers.

4.4.3 Messaging, Social Change, Political Persuasiveness

This work and many others have highlighted just how large a barrier to better connecting residents of affordable housing to high quality transit politics, NIMBYism, fear of gentrification, and other social prejudices can be. And yet, little is known of the most effective strategies for hurdling these sizable impediments across difference social contexts. Here sits an opportunity for future research to provide an impactful resource to practitioners from many fields, those relevant to transit and affordability and beyond.

Chapter 5

Resources and Innovative Tools

5.1 Introduction

Each of the detailed case studies includes a table with relevant resources and innovative tools relating to TOD and affordable housing. They can be used by transit agencies as well as a wide range of stakeholders in both the public, private, and civic sectors including local governments, community organizations, financial institutions, housing advocates, property owners, real estate developers, urban planners, and architects. By including affordable housing, parking, property, and planning/implementation as separate categories of tools, this chapter reflects the existence of separate or specific tools related to these areas in the case studies. The term "innovative tool" refers to the idea that these tools are being used across the country to tackle TOD challenges and opportunities. For example, Raleigh's Affordable Housing bond map is a unique tool that allows people to visualize affordable housing projects on a map, which could be compared to a map of areas of TOD. Comparing the two maps can help someone identify TOD areas that are missing more affordable housing projects.

This chapter combines the resources and tools into the following seven categories. Under each of the categories, a table identifies the case study, the tool or resource, and a short description. Nearly all of these resources and tools are available online, and a link for each of them is available in the "Resources and Innovative tools" section in each of the detailed case studies.

1) TOD Guidelines and Policies
2) TOD Information and Assessments
3) Affordable Housing
4) Mapping and Interactive Tools
5) Parking Guidance
6) Planning and Property Guidance
7) Progress Reports

5.2 TOD Guidelines and Policies

Guidebooks and policies serve as the cornerstone document for a city or transit agency's TOD and ETOD programs. They outline the vision, goals, planning strategies, design principles, affordable housing objectives, zoning guidance, and other key components essential to TOD initiatives.

These documents typically provide strategic direction and help shape regulatory frameworks and development plans. TOD guidelines often include detailed information on existing zoning laws, municipal regulations, and other statutory requirements that cities or agencies must consider in their TOD planning. They also can encompass related activities, such as housing policies and parking guidance. As cities and agencies develop guidelines, the documents can be comprehensive and include as much detail as possible about TOD and TOD-related activities such as housing, economic development, and parking. These documents are critical because they are the resources that provide clear guidance in implementing successful TOD and creating transit-accessible communities.

Table 5-1. TOD Guidelines and Policies

Case Study	*Tool / Resource*	*Description*
Austin	ETOD Study: Final Report	Main policy plan for CapMetro's ETOD strategy. The report consolidates resources such as the Policy Toolkit, station area planning principles, and affordable housing guidelines into one document.
Bay Area	TOD Policy	BART's vision, goals, and strategies.
Bay Area	TOD Guidelines	Information about Bart's TOD program for developers and local governments.
Chicago	City of Chicago ETOD Policy Plan	Overview of ETOD plan.
Denver	ETOD Policy	Policy and related presentation to RTD Board.
Denver	TOD Policy Sourcebook	Identified TOD processes and the appendices include design standards and parking guiding principles.
Denver	TOD Evaluation Guidelines	Principles and criteria used to evaluate TOD project.
Huntsville	The Big Picture	City of Huntsville's comprehensive master plan.
Twin Cities	TOD Policy	Metro Transit's TOD policy goals.
Twin Cities	Met Council TOD Guide	Designed for local planners, elected officials, planning commissioners, and other interested parties.
New Jersey	NJ TRANSIT's "Transit-Friendly Planning Guide"	Assist interested parties in making land use decisions around transit facilities
New Jersey	NJ TRANSIT's "TOD Policy Statement"	Includes purpose, vision statement, goals, actions, and supporting policies of TOD.
Raleigh	ETOD Guidebook	ETOD Vision, TOD design principles, station area types, zoning tools, affordable housing and financing information.
Salt Lake City	UTA TOD Design Guidelines	Guidelines that provide the goals and design elements of UTA's TOD program.
Salt Lake City	UTA Transit-Oriented Communities information	Priorities, station area, and properties.

Seattle	Sound Transit TOD 2014 Strategic Plan	TOD policy goals, strategic priorities, information on joint development, partnerships, and real property surplus.
Seattle	Sound Transit 2018 ETOD Plan	Overview of the agency's ETOD plan, including the 80/80/80 policy.

5.3 TOD Information and Assessments

TOD informational and assessment resources provide context and general insights about TOD. They are particularly beneficial for agencies and cities at the preliminary stages of TOD and affordable housing planning. They help establish a shared understanding of TOD concepts and the current regional dynamics affecting housing, transit, and economic development. These resources and tools also strengthen the case for TOD initiatives by illustrating pressing challenges—such as population growth and housing demand—and offering policy frameworks and summaries that address these challenges. Assessment and general information tools ensure that planners, agencies, and the public are aware of what TOD and affordable housing are, and what the current landscape of a particular area looks like. These tools act as resources for important definitions and summaries

Table 5-2. TOD Assessment and Information

Case Study	*Tool / Resource*	*Description*
Austin	Lessons Learned from Other Cities	CapMetro prepared a report that identifies lessons learned from other cities regarding ETOD strategies, equity tools, and equitable engagement.
Huntsville	Huntsville MPO High-Capacity Transit Concepts & Corridors	Assessment of several corridors to understand the region's travel patterns and identify the appropriate technology, operating scenarios, and capital costs required to implement efficient and equitable transit service.
Huntsville	Go Huntsville Transit	Evaluation of the city's transit services with a series of recommendations to improve service quality and create a more equitable transit network.
Twin Cities	Metro Transit 2023 Development Trends Report	Summary and analysis of permitted and planned development in the region, especially near high frequency transit.
New Jersey	Transit Friendly Planning Newsletter	Informs people on what is happening in transit friendly planning and TOD in the state and around the country: best practices, model programs,

		legislation, research, and local problem-solving experiences.
Raleigh	City of Raleigh Comprehensive Plan White Paper	Summary of Comprehensive Plan, which outlines the long-range planning goals for the city. The report also includes key housing and economic trends.
Salt Lake City	Housing and Transit Reinvestment Zone White Paper	Objectives, requirements, and processes relating to the Reinvestment Zones.
New Jersey	NJ TRANSIT TOD Website	Provides information on NJ TRANSIT's TOD program and links to important information.
Bay Area	TOD Home page	Information about BART's TOD project and policies.
Twin Cities	Met Council Roles	Summarizes different roles and responsibilities of the counties, cities, and the Met Council.
Raleigh	BRT Project webpage	Detailed information on each of the four BRT corridors.

5.4 Affordable Housing

Cities, MPOs, and transit agencies have developed resources to provide detailed information on funding mechanisms, and implementation strategies for affordable housing. These documents also identify goals, strategies, and grant programs relating to potential affordable housing initiatives. Affordable housing tools can be strategic assets that ensure TOD helps cities and agencies create communities that serve residents across income levels. They provide a roadmap for integrating housing and transit development in ways that promote long-term social and economic sustainability. For instance, BART's Affordable Housing Plan offers a comprehensive overview of the agency's housing needs and goals, including specific targets for affordable housing development within the transit district. Other resources focus on funding strategies for affordable housing, such as the Twin Cities' Revolving Loan Fund. These programs offer financial assistance, helping to fund projects that accommodate affordable housing in transit-oriented communities.

Table 5-3. Case Study Affordable Housing Tools

Case Study	*Tool / Resource*	*Description*
Bay Area	Affordable Housing Policy	Goals for housing based on income levels. Includes specific targets for affordable housing development within the transit district.
Bay Area	Framework for Determining Financial Return from Affordable Housing	BART's intentions toward its own financial return expectations for affordable housing.

Raleigh	Affordable Housing Bond Spending Plan	Detailed background on program designed to create and preserve affordable housing, including information about how public funds are allocated for affordable housing development.
Seattle	Revolving Loan Fund	Information on self-replenishing pool of money that is leveraged with transit funding.
Twin Cities	Met Council Livable Communities Grants programs	Summarizes different grant programs in the Livable Communities program, amount of funding available, and eligibility requirements.

5.5 Mapping and Interactive Tools

Mapping and interactive tools are online platforms that empower users to explore, analyze, and visualize data related to TOD and associated activities. These tools often integrate Geographic Information Systems (GIS) to present layered visualizations of transit networks, housing availability, land use patterns, and demographic information.

Raleigh, for example, has developed the Affordable Housing Bond Map, a tool specifically designed to display affordable housing initiatives in the region. This map provides key project details, including the location, number of affordable housing units, developers, and project costs. Importantly, it highlights how housing projects funded by the Affordable Housing Bond aligns with the city's proposed BRT corridors. The map can be used to identify areas underserved by bond-funded projects, enabling data-driven decisions to better synchronize affordable housing efforts with TOD objectives. This integration is critical for demonstrating the vital connection between transit infrastructure and affordable housing. These tools enhance spatial understanding by highlighting opportunities, challenges, and policy implications. They can help identify ideal development sites, assess transit accessibility to key resources like housing, and detect broader trends.

Table 5-4. Case Study Mapping and Interactive Tools

Case Study	*Tool / Resource*	*Description*
Austin	ETOD Priority Tool	Website that maps out ETOD areas and allows users to identify the appropriate ETOD policies.
Austin	Interactive Conditions Analysis Tool	Uses data analysis to understand the character and trends of growth, the built environment, infrastructure, and people.

Denver	TOD Trend Tool	Analyzes property data from a national database focusing on all multifamily and commercial properties within ½ mile of stations.
Twin Cities	Met Council TOD Prioritization Tool	Categorizes TOD station areas and provides policies for TOD implementation.
New Jersey	Transit Friendly Data Application	Webpage that allows users to map out TOD planning and TOD elements including transportation.
Raleigh	ETOD iMAPS tool	Interactive map that allows users to see where transit overlay districts are located.
Raleigh	Affordable Housing Bond Projects Map	Interactive map that shows projects which have receiving bond funding. The tool provides project locations, amount of affordable units, and cost of the project.
Salt Lake City	Wasatch Choice Map	Tool to visualize TOD elements such as housing, economic development, and transportation.

5.6 Parking Guidance

Parking plays a pivotal role in discussions surrounding TOD, with cities and agencies often grappling with the challenge of determining the appropriate amount of parking to accommodate current and projected ridership and usage patterns. Parking Guidance tools and resources outline parking's role in connectivity, provide methodologies for determining parking needs across different contexts, and address the costs associated with parking infrastructure.

Agencies like BART and RTD, for example, are exploring opportunities to repurpose underutilized parking spaces for TOD. Chicago's RTA and Bay Area's BART use case studies in their parking guidance documents as ways to describe what parking looks like in different contexts, whether that is in an urban core or suburban neighborhood. Providing a case study along with information about parking guidelines is helpful for stakeholders to understand what parking could look like in the proposed TOD project. Effective parking management can maximize land use, reduce car dependency in transit-rich areas, and support transit-friendly character of TOD projects.

Table 5-5. Case Study Parking Guidance Tools

Case Study	*Tool / Resource*	*Description*
Bay Area	Replacement Parking for Joint Development. An Access Policy Methodology	Suggested method for replacement parking strategies. The model quantifies ridership and revenue

		impacts of different TOD scenarios.
Chicago	RTA "Access & Parking Strategies for Transit-Oriented Development	Helps communities focus on prioritizing transit, bicycle, and pedestrian access. Includes information about what parking looks like in different contexts, whether is an urban core or suburban neighborhood.
Denver	Parking Guide Principles	Board resolution providing guidance on parking issues.
Denver	Residential Parking in Station Areas	Survey of parking at RTD's station areas.

5.7 Planning and Property Guidance

These planning and property guidance resources provide detailed information about long range plans, zoning, urban design requirements, land availability, ownership, zoning requirements, and agency property procedures. They also describe ordinances and regulations that can help promote the development of new affordable homes. In the case of Seattle, the Washington State Law 81.112.350 explains legal parameters, including the requirement to allocate 80% of surplus property proceeds, enabling informed financial and legal planning in property transactions.

Table 5-6. Planning and Property Guidance Resources and Tools

Case Study	*Tool / Resource*	*Description*
Chicago	Connected Communities Ordinance	City ordinance that advances equitable development and thriving neighborhoods near transit.
Chicago	Formed Based Codes: A step-by-step guide for Communities	Step-by-step guide to form-based codes, an alternative approach to zoning.
Chicago	Setting the Stage for Transit	A "how to" design manual for transit supportive development.
Denver	Unsolicited Proposal Procedure for Joint Development	Process, requirements, and timeline for evaluating developers' interests in redeveloping agency property.

Denver	RTD TOD Team Property Database	Database tracks development within ½ mile of RTD stations.
New Jersey	Request for Qualifications/Proposals for NJ TRANSIT Properties	Information regarding development opportunities.
Raleigh	Transit Overlay District webpage	Provides important information and components of transit overlay districts.
Salt Lake City	UTA Station Area Planning: Standing Operating Procedures	Purpose, scale, scope, roles and responsibilities associated with station area planning.
Salt Lake City	Murray North Station Area Plan	Example of a station area plan.
Salt Lake City	Wasatch Choice Vision	MPO's long range plan.
Seattle	Real Property Excess, Surplus, and Disposition Policy	Provides guidance on surplus Sound Transit property
Seattle	Washington State 81.112.350 law	Legislation regarding revolving loan fund and 80% surplus property requirement.

5.8 Progress Reports

Status update and progress reporting tools report on the progress of TOD related projects. They typically highlight successes and identify challenges in meeting an agency's goals. They also reveal an agency's priorities in allocating resources. A status update tool is important to maintain a city or agency's transparency and accountability. It is crucial to maintain public support and developer confidence. Status tools keep people informed, identify delays, and highlight successes in TOD projects. Additionally, status report tools can be a source of changing or maintaining direction. For example, if a quarterly report shows little development of affordable housing, an agency can be informed of a policy that is not working or identify a strategy to change direction.

Table 5-7. Case Study Status Update Tools

Case Study	*Tool / Resource*	*Description*
Austin	Anti-Displacement Dashboard	Spending of the $300 million anti-displacement funds approved by voters in 2020.
Bay Area	TOD Program Work Plan	BART's TOD accomplishments, priorities and prioritization process.
Chicago	2023 Implementation Report	Summarizes activities and project awards for the RTA's Community Planning and Access to Transit programs.

Denver	2023 TOD Status Report	Annual report summarizing station-area development.
Raleigh	City of Raleigh Affordable Housing Annual Report	Annual FY22-23 affordable housing report: updates on affordable housing goal progress and information on funding for affordable housing.
Seattle	TOD Quarterly Reports	Provide updates on TOD program.

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Appendix A

Literature Review

Executive Summary

Public transportation can offer an affordable, convenient, and environmentally sustainable way for people to get around. For people with low incomes—and for many others who cannot or do not want to drive—bus and train options are an essential link to school, work, and recreation. Access to transit, however, is unevenly distributed, with some areas having more frequent, reliable, and rapid options than others. One key opportunity for policymakers is to link planning or provision of affordable housing in areas near transit, such as in connection with transit-oriented development (TOD). This can help reduce overall costs of living for people with low and moderate incomes, in order to save them money on both housing and transportation. Coordinating planning for transit and affordable housing can also, theoretically, encourage more transit use overall and give more people access to opportunity.

In order to explore these issues, this literature review explores research focused on, first, how access to transit impacts peoples' transportation choices. Next, it provides information on what is known about the specific travel patterns of people with low incomes—the people who are most likely to live in affordable housing. Third, the literature review identifies what is known about transit's impacts on housing costs. Finally, the research team considers how transit access might impact gentrification and displacement.

This paper is the result of a detailed literature review of dozens of scholarly articles that summarize what is known about the links between affordable housing and access to public transportation. This review enables us to extract key findings policymakers working in both fields can leverage to understand the importance of undertaking planning for these two issues in parallel. It also highlights a series of recommendations for local and state policymakers to work toward the maximum coordination of transit and affordable housing, for the benefit of all.

Key findings from the Literature Review

Our review of the literature points to a wide array of conclusions about the relationships between transit and affordable housing, with several standing out in particular:

- Affordable housing units are, on average, more likely to be located near transit than other types of housing, in the context of most housing being accessible to transit overall. Nonetheless, a majority of affordable housing units—subsidized by public investments or not—are located far from fixed-guideway transit stations. This dilutes the ability of people with low incomes to take advantage of the cost savings inherent in transit use.
- People who live near transit are more likely to use public transportation. They also are less likely to take car trips or own a car. Residents with low incomes are particularly likely to use transit, to a large degree because of their low car ownership rates.

- Transit access—meaning walkability to transit stations—is linked to higher home values and rent levels on average, especially when transit stations are located in neighborhoods with a mix of destinations within reasonable distance. Given the simultaneous greater presence of affordable housing units in these same areas, transit areas may be particularly lacking housing units affordable for people with middle incomes. Higher housing costs near transit have been associated with increased average incomes and educational achievement over time among residents near stations, but not with substantial changes in the racial characteristics of those residents. There is mixed evidence on the impact of transit adjacency on displacement.
- The literature review identifies four major barriers to affordable, equitable TOD: cultural and social, such as a preference for car use over transit; planning processes, such as rules that make investing in TOD take longer than other sorts of projects; financial barriers, such as difficulties obtaining loans due to lenders who are averse to the risk of investing in projects near transit; and transit barriers, such as inadequate public transportation options in TODs.

In the context of these findings, the literature review identifies a series of approaches policymakers have taken to encourage additional affordable, equitable housing near transit. The federal government has created new programs designed to enable asset disposition of surplus transit agency land and is providing low-cost loans for TOD. Some state governments are targeting grant and loan programs for affordable housing units located near transit. And transit agencies themselves are working with developers to ensure affordable housing is integrated into new stations. These strategies can help provide policymakers options to coordinate planning between affordable housing and transit.

Introduction: Linking affordable housing and transit

This section reviews existing research on what is known about affordable housing and access to transit, largely in the context of the United States. It specifically focuses on three key themes that are key to understanding the connection between these two policy areas. First, it documents research on links between transit access and housing availability, which is essential to understand in order to confirm the value of coordinated planning between transit and housing. Second, it explores what is known about travel behavior by transit-adjacent residents; this is important because if residents of affordable housing have different behavior than other residents, this should inform how policymakers think about planning near transit. Third, it describes transit's impacts on housing affordability, including in terms of gentrification and displacement; this provides context for how affordable living near transit is in the first place, and whether outcomes change over time. It concludes with a review of what we know about barriers to affordable TOD—and briefly describe a set of known best practices to encourage the creation of equitable TOD.

Our methodological approach

To conduct this literature review, the research team combed through Google Scholar using keywords to identify dozens of scholarly articles and reports related to the links between public transportation and affordable housing. We examined the references in that scholarship, too, to find additional sources before we reached a saturation point at which we were no longer able to identify additional applicable research in our subject area. The research team first conducted an annotated bibliography of each source before organizing findings from the various lines of scholarship into themes. We leveraged these themes to identify key conclusions from the research, while also pointing to exceptions to the rule where they exist.

Given that the focus of our work is evaluating the relationships between transit and affordable housing, it is worth emphasizing from the start that the link between the two is difficult to establish. At the heart of the problem is self-selection: People who live near transit often choose their residential location specifically because of transit access; as a result, evaluating their travel decisions after their moves may not be particularly meaningful (Cervero and Radisch 1996). There can also be chains of impact that influence outcomes over time. For example, planning a transit station can increase land values, which then goes on to increase rents. These increases in rent can then accelerate displacement of people with low incomes and lead to their replacement with people with higher incomes (Rennert 2022). Because people with higher incomes are more likely to own cars, those new residents may be less likely to take transit (Pollack et al. 2010). This raises some key questions that previous research has only been partly able to resolve: Does this mean that transit investments or TOD result in higher land values, higher rents, and displacement? Or does this mean that the other local characteristics in a community coincide with transit and TOD investment to influence outcomes such as travel choices, demographic change, and housing affordability?

Just as important is the fact TOD projects have other characteristics that make adjacency to transit alone difficult to disentangle as a cause of such outcomes, versus other potential explanations. For example, TOD is likely to feature buildings and uses at high densities; are the travel choices of their residents the result of transit access or housing densities? We know that compactness of a neighborhood is associated

with reductions in transportation costs, but those costs may decline with or without access to transit (Hamidi and Ewing 2015). Finally, while issues like housing affordability are undoubtedly influenced by transit access to some degree, it is essential to clarify that individual and household characteristics ultimately play a more important role in influencing how people travel and how much they can spend to still afford to live in a neighborhood than characteristics of the built environment (Makarewicz et al. 2020).

In this review, we acknowledge the limitations of any research that attempts to link public transportation and affordable housing. The research team specifically highlights where scholars have been able to more successfully disentangle the methodological challenges we describe above. But we also note where additional research is needed to further our understanding.

What are affordable housing and transit-oriented development?

Before describing what previous scholarship has identified about the links between housing and public transportation, the research team set about to establish definitions for affordable housing and TOD. Neither of these concepts have a universally agreed-upon definition, but in this section, we review how these issues have been largely discussed in the literature.

Defining affordable housing

There is no consistent scholarly delineation of what is or is not affordable housing. But the most common definition is that housing is affordable if it costs a family or household less than 30 percent of their gross income before taxes. This definition is used by the U.S. Department of Housing and Urban Development (HUD) for its rental programs (HUD 2014). Families living in federally supported public housing—publicly owned and maintained units—are expected to pay no more than 30 percent of their monthly incomes to rent every month. Similarly, lenders generally restrict the size of mortgages to a level that assumes that households should pay no more than 28 percent of their incomes on housing costs (Nerd Wallet 2024). HUD defines households that pay more than 30 percent of incomes for housing as cost burdened, and those that spend more than 50 percent as severely cost burdened (McCabe 2017).

Housing affordability as it is typically defined, then, is a function of household income: Families with higher salaries can "afford" a more expensive home. This is, admittedly, an arbitrary rule; 30 percent of the income of a person with a low-paid job may be large enough that it prevents them from being able to afford enough food to eat—whereas 30 percent of the income of a highly paid individual could have little impact on their overall quality of life.

Housing affordability is often conceptualized within the scope of incomes across metropolitan areas. In defining income limits to qualify for a variety of its programs, HUD compares household incomes—once adjusted for household size—with the median income in each metropolitan area (this is known as the area median income, or AMI). HUD defines households at or below 30 percent of AMI as extremely low income; between 30 and 50 percent of AMI as very low income; between 50 and 80 percent of AMI as low income; and between 80 and 95 percent of AMI as moderate income (Teles et al. 2023). A housing unit dedicated to households at 50 percent of AMI in a region with a median income of $100,000 could thus charge a monthly rent of $1,250, assuming the 30 percent of income threshold mentioned above.

While housing costs constitute the largest share of expenditures for most families in the United States, transportation costs also make up a large amount of the average family's income. In 2022, for example, the average U.S. family spent 33.3 percent of expenditures on housing and 16.8 percent on transportation (Bureau of Labor Statistics 2023). Transportation and housing expenditures thus add up to roughly 50 percent of overall income. The Center for Neighborhood Technology has defined this concept as the Housing + Transportation index; the organization proposes that families should not spend more than 45 percent of income on the two expenditures combined. That said, transportation costs vary tremendously based on household car ownership and car use. Families with no car—depending on their incomes—spend one-fourth to two-thirds as much on transportation costs as those with cars (Freemark 2022). A family seeking to keep housing and transportation costs in check might be able to spend more on housing

if they do not need car access; the opposite would be true for a family that needs or wants to have a car around.

Some scholars argue that the definition of housing affordability should be adjusted to take into account transportation costs (Coulombel 2017). This would enable, for example, families with no car to qualify for a larger mortgage, giving them greater housing choice. This would also, Coulombel (2018) notes, encourage families to choose dwelling locations that are more "location efficient," meaning their residence could be located in places with lower transportation costs. Indeed, while housing costs in metropolitan areas like New York are much higher than those in regions like Houston, once having accounted for the fact that public transportation systems are much more accessible in the former regions, households' overall housing plus transportation expenditures are actually lower in the New York region (Guerra and Kirschen 2016).

Finally, affordable housing can be defined not just in terms of whether it is affordable as a share of a household's income, but also in terms of whether it is supported by governmental subsidies. HUD subsidizes millions of housing units throughout the country through the public housing and project-based Section 8 programs, as well as millions of families through the Housing Choice Voucher program; these units and vouchers are designed for families with very low or extremely low incomes. HUD also supports emergency housing shelters for people and families experiencing homelessness. The U.S. Department of the Treasury allocates Low Income Housing Tax Credits (LIHTC) to states and cities to distribute to developers to build or renovate housing units that are affordable to families with low incomes. A substantial share of LIHTC projects is built with additional subsidies that provide a higher level of affordability, such as by including project-based Section 8 subsidies (Scally et al. 2018). Many states and cities have their own housing funds that subsidize housing, while some rely on the private sector to provide subsidized housing through inclusionary zoning programs that mandate a certain share of units be dedicated for low or moderate income families as part of new development projects (Spauster et al. 2021).

These public programs do not always account for variations between different parts of metropolitan areas in terms of housing costs, and transportation costs are never accounted for (Bieri and Dawkins 2016). That said, HUD does allow local agencies to adjust rental assistance based on local-area rents, enabling them to support families who want to live in more or less expensive neighborhoods (Center on Budget and Policy Priorities 2018).

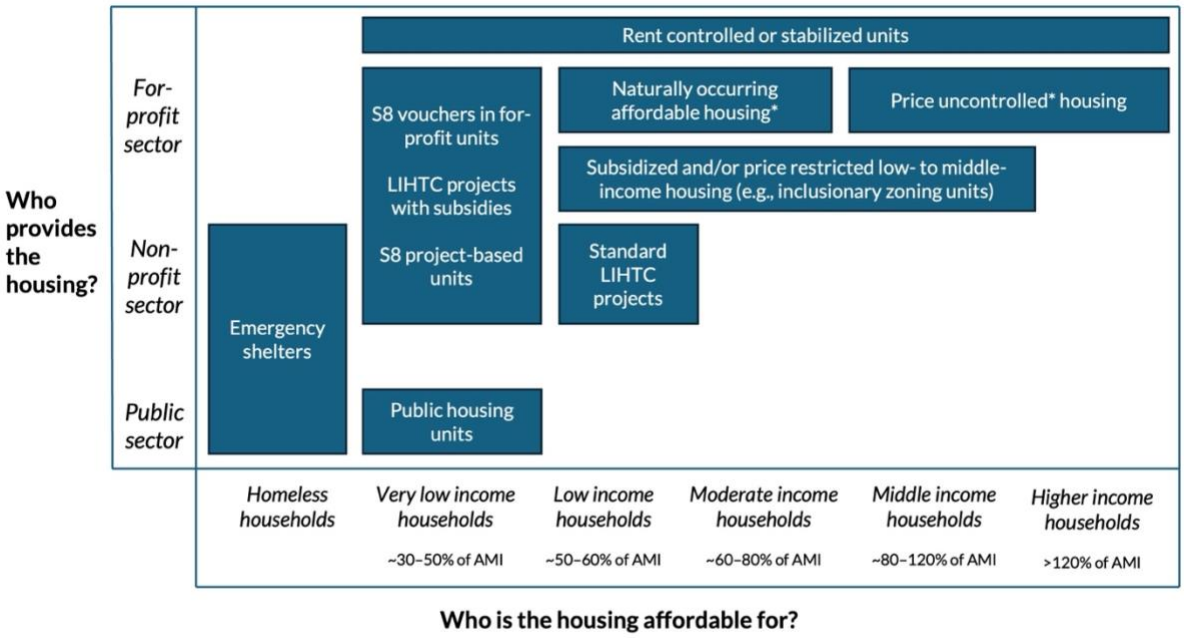
Publicly subsidized affordable housing can be contrasted with what is sometimes referred to as "naturally occurring" affordable housing, or NOAH, which is not publicly subsidized, but which nonetheless is affordable to families with low or moderate incomes due to the low rent levels charged by their private landlords (Weicher et al. 2017). NOAH units rarely include strict limits on family incomes (meaning, unlike HUD-subsidized units, families with higher incomes are allowed to live in them). But they constitute an important share of the overall affordable housing market in the United States, including near transit, as described in sections below.

There is also a small share of housing units in some U.S. cities whose rents are stabilized by government rent control boards. These units rarely include housing income requirements—meaning they can be inhabited by families with a wide variety of incomes. But they do offer a major source of housing

affordability on the private real-estate market in some large cities like New York and Washington, DC (Rajasekaran et al. 2019).

Figure A-1 provides a simplified summary of affordable housing in the United States. On the X axis, this figure notes for whom such units are affordable, divided by income range. On the Y axis, this figure details who provides the housing. Note that, for middle and higher income households, the private market often provides housing that is affordable even without subsidies or price controls.

Figure A-1. Housing that is affordable, in terms of limiting housing cost burdens



Source: The authors, based on a review of the scholarship.
Notes: AMI = area median income. LIHTC = Low Income Housing Tax Credits. S8 = Section 8 (also known as Housing Choice Vouchers). * Households that own these 'unsubsidized' units typically benefit from the mortgage interest tax deductions at the federal level and homestead exemptions at the local level, both of which are subsidies.

Defining transit-oriented development

Transit-oriented development (TOD) is the combination of high densities (meaning more people in specific area), diversity (meaning a mix of uses, from residential and commercial to institutional and green space), and design (meaning neighborhoods designed to be walkable), applied to neighborhoods or projects located near effective public transportation services (Cervero and Kockelman 1997). TOD has become a major tool in the planning profession in the United States and could be a key approach to generating affordable housing near public transportation.

Being adjacent to transit service means access to destinations for residents, visitors, and workers via an affordable mode of transportation. But transit adjacency does not have uniform characteristics. First, distance varies: development being near transit can be directly connected to stations, within a five-minute

walk, or further afield. Second, transit quality differs: transit can offer a range of options, from all-day, frequent rail service to infrequent, unreliable bus routes. Finally, urban design and surrounding land uses diverge: the neighborhoods near transit—and transit stations themselves—span the gamut when it comes to how comfortable they are in terms of supporting people walking and biking to and from stations, let alone being able to take advantage of public services and other resources in the surrounding area.

To help differentiate the fact of being transit adjacent from being truly transit oriented, scholars and practitioners developed the TOD concept in the 1980s (Calthorpe 1993; Thomas and Bertolini 2017). Calthorpe (1993) defines TOD density as achieving 25 to 62 housing units per hectare (10 to 25 housing units per acre). Others add mobility-related elements, including higher levels of destination accessibility, lower distances to transit stops, and policy that manages travel demand to limit car use (Jamme et al. 2019). This combination of factors, the argument goes, encourages people to take transit rather than drive. TODs thus can help encourage environmental sustainability and create communities with lower costs of living, by enabling people to accomplish most tasks without driving (Belzer and Autler 2002). Successful TODs can also result in a higher density of uses since they do not need to incorporate as much parking.

A whole line of scholarship has attempted to parse out the difference between transit adjacency and transit-oriented development. Using measures of density, diversity, and design, Renne and Ewing (2013) find that a large share of neighborhoods adjacent to transit do not meet TOD goals, especially those related to mode split and discouraged vehicular travel. Belzer and Autler (2002) point to a combination of pedestrian infrastructure, high densities, savings for travelers, livability, higher financial returns, a diversity of housing types, and efficient land-use patterns as key to achieving the most effective TOD outcomes.

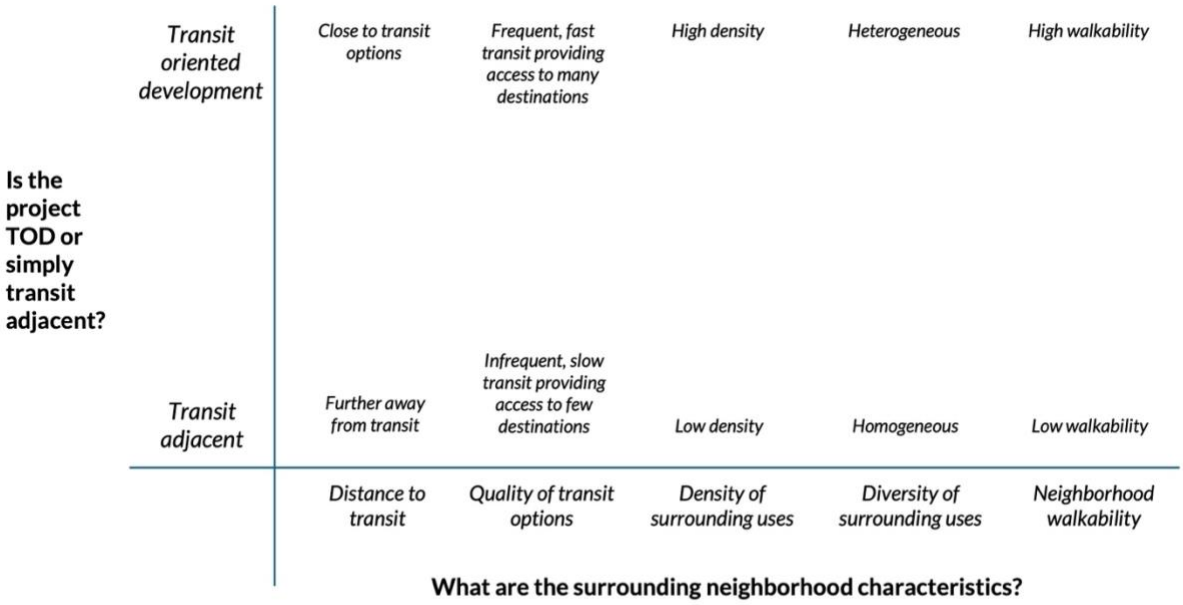
There has been some disagreement about how close a development project has to be to a transit station to classify as TOD. Scholars have argued for various distances, from a block or less (Ewing et al. 2015; Keniewska et al. 2024) to 2,000 feet (Calthorpe 1993) to a half mile (Bernick and Cervero 1997; Dittmar and Ohland 2003; Fogarty and Austin 2011; Nasri and Zhange 2014; Sourourian 2010). Some emphasize that different types of TOD are feasible at different distances to transit.

Both existing and new neighborhoods could be classified as TODs. Classic streetcar suburbs of the early 20th century, which incorporated commercial development and relatively high-density apartments, helped serve as a model for the TOD concept. But the TOD model differed from the standard development practice of the late 1980s and early 1990s (as well as today's). While most newly built neighborhoods were principally comprised of low-density single-family homes isolated from other uses and where walking was either useless to fulfill day-to-day needs or impossible given a lack of sidewalks, TODs feature a dense combination of building types and uses and excellent pedestrian facilities around stations. TODs are both nodes of a metropolitan area and vibrant, appealing neighborhoods (Bertolini and Spit 2005). Ultimately, TODs are not only car-light but provide the opportunity to re-center the metropolitan area away from requiring people to move around by cars (Bertolini et al. 2012; Ewing and Cervero 2001).

Walkable urban design is a key element of the TOD concept. TODs, proponents suggest, should feature a grid of streets surrounding small blocks (Arrington and Cervero 2008; Calthope 1993; Lund et al. 2004). This grid should be designed for walkers' comfort, first and foremost, and ensure that getting to the transit station itself is a key goal. One key opportunity is to coordinate the location of retail between homes and

stations, to support rail-pedestrian trip chaining (Hickman and Hall 2008). Figure A-2 illustrates key elements of successful TOD, as compared to simply transit-adjacent development.

Figure A-2. Key elements of successful TOD



Source: The authors, based on a review of the scholarship.

TOD can be implemented in a variety of ways. One approach is the prototypical New Urbanist private investment: New neighborhoods in suburban areas. These communities include substantial parking and extensive street space for cars, but they also incorporate features designed to promote walking, such as town centers that ensure that retail shops and restaurants face the sidewalk rather than parking lots. While they are principally comprised of single-family homes, these also sometimes include apartments in the center. Ultimately, these types of suburban areas could incorporate elements of the core city, but in a more desirable and less congested manner (Ibraeva et al. 2020).

Private investors also support TOD through infill construction in urban neighborhoods. These projects prioritize increasing residential densities around transit stations and often include elements such as retail on the first floor of apartment buildings. To enable these types of projects, local governments often institute mixed-use zoning policies that encourage density and diversity. In some cases, transit agencies work with private investors to conduct "joint development" encompassing projects located adjacent to, or sometimes directly on top of, stations.

TOD can apply to both rail transit and bus services

Most of the research about TODs since the 1980s has focused on access to rail transit. (Some scholars, such as Bertolini et al. 2012, simply define TOD as only occurring near rail stations.) This may be a result of the temporal confluence of the growth of scholarship related to TODs and the increasing construction of light rail and streetcar lines in U.S. cities during that period. It may also reflect the widespread

perception—often not grounded in reality—that rail transit always provides a better quality of service than bus options. Finally, it may be a consequence of a view that since rail transit projects are so expensive to implement, their cost effectiveness should be increased by ensuring an adequate source of ridership near stations, which can be better accomplished by promoting TOD in the areas nearby.

Over the past two decades, however, there has been increasing interest among urban transportation scholars and local governments in improving bus service. Inspired by cities like Curitiba, Brazil, whose bus rapid transit (BRT) system moves hundreds of thousands of riders daily rapidly and reliability, some U.S. localities and transit systems have concentrated resources on improving bus quality through bus-priority infrastructure projects, such as bus lanes and traffic signals that adjust to ensure that buses move through intersections before other modes of transportation (Vanasse Hangen Brustlin, Inc. 2011). In theory, better bus service could be associated with TOD.

Key to making bus-based TOD effective is frequent service operating along high-quality infrastructure (Currie 2006). In other words, a regular bus route operating to traditional bus shelters (or even just bus poles) is unlikely to generate much interest from private investors that are considering developing new projects in the surrounding areas. Moreover, implementing improved bus service in a way that avoids exposing the surroundings to high levels of noise and particulate pollution is needed to make areas near bus transit appealing. Electric bus service may resolve this issue at least to some degree.

Despite this growing enthusiasm for TOD around bus networks, some argue that bus-based TOD faces some fundamental obstacles. Because bus service is generally slower and often fails to provide regional connectivity, it may not be able to attract the concentrated investment that rail systems have generated (Cervero and Dai 2014). Moreover, Guo et al. (2023) argue that the nimbleness of bus service—the ability to move service around as demand changes—means that bus systems should respond to development, rather than be used as a mechanism to promote development.

The rise of equitable TOD

As implemented, TODs have sometimes been associated with rising housing prices, gentrification, and even displacement (we delve into these issues in the sections below). With rare exceptions, initiators of the TOD concept rarely mentioned housing affordability as a key goal, focusing on travel behavior instead (Ibraeva et al. 2020). As a result, over the past decade, community stakeholders and policymakers throughout the United States have promoted the concept of equitable TOD, the goal being to ensure that people of all backgrounds have the opportunity to live in areas near transit, and going a step further, to provide better transit options for those mostly likely to be transit users (Bardaka and Hersey 2019). Public policies could shape TODs to help them achieve this goal from the commencement of project planning.

Achieving the promise of equitable TOD involves resident engagement in the planning process (Pollack et al. 2010). Equitable TOD also incorporates affordable housing and preservation, with the assumption that those sorts of investments can help prevent gentrification, or at least allow communities to avoid displacement (Zimmerman et al. 2022). In the end, equitable TOD can guarantee that people of all incomes and racial backgrounds have access to transit.

Thus far, equitable TOD remains nascent in most parts of the United States. But a select number of cities, such as Baltimore and Chicago, have incorporated the concept into their planning processes and zoning

codes. Some localities have chosen to require a minimum percentage of affordable housing in new private-market projects near transit. Others have concentrated their investments in affordable housing in areas near transit stations. And a small number of transit agencies have made equitable TOD a cornerstone of their policy related to development in areas surrounding stations, as the research team describes in the concluding section of this Literature Review. But more evidence is needed to establish the right formula to ensure equitable access to transit.

Policymakers increasingly acknowledge the link between transportation and housing

Responding to the need to address high costs of living and encourage travel using modes of transportation that produce fewer carbon emissions, policymakers at various governmental levels in the United States have increasingly come to see linking housing and transportation planning as a priority. The federal government, for example, has incorporated location accessibility through public transportation as a key metric in evaluating the location of affordable housing (Haas et al. 2016). Several states have integrated transit access into their decision making related to what projects to award LIHTC funds. And some localities have adjusted their zoning policies to encourage higher densities in areas adjacent to stations.

Even so, U.S. metropolitan areas face what Kramer (2018) refers to as a paradox of access. In cities like Boston and New York, affordable transportation options that serve much of the region are available, but many of the neighborhoods located near stations are too expensive for moderate and low-income families to afford. Certain housing units are affordable, but these are often located in automobile-dependent suburban areas without transit access. These dueling conditions make affordable living difficult for many families. And the situation has arguably worsened due to a combination of inadequate availability of high-quality transit service, the fact that it is difficult to serve auto-centric communities with effective public transportation, and limited housing construction in areas near transit stations. This situation sometimes results in increased competition for the homes that are available near stations, amping up real estate prices, as described below.

Over the past several decades, U.S. cities have become increasingly adept at concentrating homes in a manner that is likely to encourage less driving and more transit use. The share of new housing units added in very-low-population density areas declined substantially in the 2010s compared to previous decade, and the share of additional units located within two kilometers (about 1.25 miles) of rail or BRT stations increased from only about 6 percent nationwide in the 1970s to 20 percent in the 2010s (Freemark 2023). In examining housing stock growth, Freemark (2024) finds that in the 1960s through 1980s, neighborhoods adjacent to new rail or BRT stations added homes at a slower pace than those with no transit access. This trend reversed in the 1990s and beyond, such that such transit-adjacent neighborhoods are now growing more quickly.

How common is affordable housing near transit?

On average, people who live close to transit are more likely to have low incomes than people who live further away, both within center cities and in suburban areas (Pathak et al. 2017; Pollack et al. 2010). This could mean either that people with limited incomes are attracted to the cost savings made possible by

living near transit, and/or that housing in those areas is, on average, more affordable than elsewhere, though as we explore below, transit investments are also often associated with rising housing costs. Even so, in TODs specifically—meaning walkable, dense, and mixed-use neighborhoods near transit—affordability remains limited. Examining 107 TODs in 24 metropolitan areas, Kaniewska et al. (2024) find that only about 24 percent of housing units are affordable for households earning from 50 to 80 percent of AMI, with the majority of those being non-publicly subsidized. They also note that about half of the TODs they study have no affordable housing units at all, a finding shared by Ewing et al. (2022).

Evidence suggests that publicly subsidized affordable housing—units that receive support from HUD and other entities to keep rents low—is more likely to be located near transit than housing overall. Housing units with federal subsidies and that are affordable to families with low incomes are more likely to be located near rail or BRT stations in the 10 largest U.S. metropolitan areas than are unsubsidized homes, though less than half of subsidized units are located within 500 meters of a station in all but the New York City region (Freemark 2023). Nationwide, about 15 percent of projects funded with LIHTC subsidies are located within a half mile of a rail station, and rates have increased slowly over time both nationwide (Zuk and Carlton 2015) and in specific places, like New York City (Ellen and Welescouch 2015) and Orange County, California (Houston et al. 2013). HUD-subsidized housing, particularly that which is funded by the public housing program, is more likely to be located in walkable neighborhoods than other homes across metropolitan areas (Koschinsky and Talen 2015).

Have transit investments been made specifically to serve affordable housing? Zuk and Carlton (2015) find that half of new rail transit stations have been added within a half mile of existing LIHTC projects, but they do not explore whether that choice was intentional or coincidental. Guo et al. (2023) develop an approach to altering bus routes to improve the transit accessibility of affordable housing, but, as far as the research team could identify, their approach has not been implemented on the ground.

Residents in housing located near transit are more likely to take transit and use cars less frequently

How does the built environment impact transit use? Pre-pandemic, more than a third of TOD residents in the United States commuted by public transportation, a far higher rate than across the nation overall, to a substantial degree because access to transit is far superior in TODs than elsewhere (Renne and Ewing 2013). Moreover, neighborhood conditions play a major role in shaping mobility. There is a strong correlation between transit ridership and community job and population densities, with higher employment densities most strongly associated with more riders (Cervero and Guerra 2011). One hundred additional jobs within a quarter mile of a station, Guerra and Cervero (2013) find, are associated with 69 additional weekday transit rides, whereas 100 additional residents in the same area are associated with 34 additional rides.

In table II-1, we summarize major conclusions from scholarship measuring the link between transit *adjacency* and travel patterns. Researchers largely agree that residents living near transit stations (typically rail transit stations), both in defined TODs and elsewhere, drive less than those living elsewhere (Arrington and Cervero 2008; Boarnet et al. 2017; Ewing et al. 2022; Tal et al. 2013; Zamir et al. 2014)

and take transit more (Ibraeva et al. 2020). Transit use is higher during periods when there is a growing economy (Cervero et al. 2004), in neighborhoods with higher densities (Ewing et al. 2015), where there is better walkability (Ibraeva et al. 2020; Renne and Ewing 2013), and when there is limited parking available at trip origins and destinations (Chatman 2013). In one particularly interesting study that compares travel behavior before and after the opening of the Expo light rail line in Los Angeles, Spears et al. (2017) show that residents substantially reduced their car use and took public transportation more due to the transit investment.

Table A-1. Ease of transit access is associated with more transit ridership, especially in densely populated neighborhoods

Study	Geography and period	Method	Finding
Synthesis finding 1: Transit access is associated with higher transit use and less car use, especially in walkable, dense neighborhoods			
Arrington and Cervero 2008	17 TOD projects in four metropolitan areas across the United States	Measured actual motor vehicle use at projects.	TOD residents take substantially fewer car trips, compared to the ITE manual, with 44 percent lower trip rates. This is especially true in denser neighborhoods closer to regional centers. Even so, parking is designed for most TOD as if it were the same as elsewhere.
Boarnet et al. 2017	Southern California, 2013	Compares household travel for residents within and outside station areas.	Residents within a half mile of transit have lower VMT than elsewhere. High-income households reduce their VMT by a greater amount (but they start out higher); those with lower incomes increase their transit ridership to a greater degree.
Cervero et al. 2004	United States, recent decades	Review of evidence from previous studies.	TOD is associated with higher transit ridership, but especially during economic upticks, when traffic congestion increases, and when there is economic and population growth in an area. Self-selection is a major explanation for outcomes.
Chatman 2013	Northern New Jersey, within two miles of rail stations, 2009	Household survey of housing, parking, and travel patterns.	Automobile ownership and travel were much lower among households in new buildings near rail stations, but the best explanation is household tenure, density, and parking availability. Parking, both at origin and at destination, is the key attribute explaining transit use.
Ewing et al. 2015	United States, regions with household travel surveys, 2000-2012	Pooling of travel and built environment data from a number of regional travel surveys.	VMT declines in contexts where transit stops are within a quarter mile. Auto trip frequency also declines within increasing densities of transit stops within a half mile.
Ewing et al. 2022	Five TODs across the United States	Compare trips and parking in TOD using manual surveys with ITE baseline.	Finds that case-study TODs have substantially less driving and parking than conventional projects. Peak parking demand is one half that in the ITE. Car mode shares are low.
Ibraeva et al. 2020	Global	Review of scholarship around the world related to TOD.	Residents near transit generally commute more by transit than others, but this is more true when the neighborhood is a TOD, meaning dense and walkable. TOD also is associated with lower car travel.
Renne and Ewing 2013	Neighborhoods near transit across the United States	Compares neighborhood characteristics with transit commuting.	Finds that TOD, as compared to hybrid or TAD areas, is likely to result in 3.5x higher levels of transit, walking, and biking use, plus half the level of car ownership. Notes that a doubling of activity density is associated with a 15 percent higher

Study	Geography and period	Method	Finding
			transit use; a higher jobs-to-residential ratio also increases transit use.
Spears et al. 2017	Neighborhoods around Expo Light Rail Line in Los Angeles, 2011–12	Survey of residents before and after line implementation	Residents near line had similar travel patterns before line opened; 18 months after, those within a kilometer of stations drove 9.75 miles less per day and took 0.21 more rail trips per household.
Tal et al. 2013	Variety of locations, 1985–2001	Comparison between a variety of studies.	Finds that moving a mile closer to a transit station reduces daily VMT by 1.3 to 5.8 percent; effect is more pronounced further away.
Zamir et al. 2014	TOD dwellers in Baltimore and Washington, D.C., 2007–08	Models based on local household survey data.	TOD dwellers had fewer car trips and shorter travel distances for all modes, after controlling for demographics. TODs in Washington were more effective on these counts than those in Baltimore.
Contrasting finding 1: New residents near transit do not use transit at higher rates, and car ownership may increase due to resident composition			
Cao and Schoner 2014	People in neighborhoods around Hiawatha light rail in Minneapolis, 2011	Compares with two comparable corridors as controls. Surveys individual households selected from dataset of movers, using propensity score matching to compare people's travel.	New residents near light rail use transit as much as new residents elsewhere in the city. But residents who lived there before use transit at higher rates (about 2 more trips a month). Trip increases by transit for going to a store, restaurants, and entertainment, and for both non-work and commute trips.
Kwoka et al. 2015	Residents in the Denver metropolitan area, 2009	Survey of travel behaviors, comparing drivers versus non drivers.	Find that living near a transit station does not in itself increase transit use, but if their workplace is near transit, they are less likely to drive. These people are less likely to drive on other trips, as well. Does not control for personal characteristics.
Pollack et al. 2010	Neighborhoods served by new rail transit stations throughout the US, 1990–2000	Comparison of neighborhood demographics over time.	Public transit use increased in station areas more quickly than in the surrounding region in 57 percent of station areas. At the same time, however, car ownership rates increased more quickly in 71 percent of station areas.

A minority of researchers argue that the link between transit use and transit access is not as strong as others have suggested. In examining Minneapolis, Cao and Schoner (2014) find that, when people move into a neighborhood near light rail, they are likely to ride transit as much as residents who move into neighborhoods where only bus service is available. And Kwoka et al. (2015) find that the positive association between living near transit and using transit more only applies if peoples' workplaces are *also* located near transit. Finally, though Pollack et al. (2010) find that transit use is higher near stations, they also find that car ownership grows more quickly in those areas, likely because of the higher incomes of those neighborhoods' residents.

What is clear is that higher densities result in more cost-effective transit investments and service. Though capital costs for transit projects rise with population density, the additional riders generated by serving more populous areas more than make up for those added expenses (Guerra and Cervero 2011). Cervero and Guerra (2011) argue that cost-effective light rail investments require about 30 people per gross acre around stations, and cost-effective heavy rail projects require about 45.

It is worth emphasizing that the predominant determinant of travel patterns in the U.S. is not the built environment or the availability of transportation services—it is the income of travelers. Pre-pandemic, wealthier people were likely to take more and longer trips overall, compared to others living in similar communities (Ewing and Cervero 2001; Martin et al. 2016). (These conditions may have changed as a growing share of people with white-collar jobs switched to working from home.)

Moreover, as mentioned above, there is some self-selection bias inherent in examining the travel patterns of people based on their residential locations. People who want to live in areas near transit are more likely to choose neighborhoods with that option, unsurprisingly (Langlois et al. 2015). Even so, some researchers have demonstrated that the effect of transit access on transit use remains even after controlling for that reality, such as by comparing travel patterns before and after the opening of a new rail line (Spears et al. 2017). Even after controlling for residential self-selection, built environment conditions explain a large share of individuals' travel patterns (Cao 2009; Cao et al. 2009), especially those of younger people and renters (Humphreys and Ahern 2019).

Finally, it is worth asking whether the Covid-19 pandemic has altered conditions for transit agencies. If a greater share of people now works from home, do office locations matter as much in terms of ridership? As of this writing, the share of employees working from the office is slowly increasing, so making any long-term conclusions from data related to working from home may not be a good idea. Nonetheless, this issue deserves further analysis.

Residents with low incomes are more likely to use transit

Because of the affordable mobility their services provide, transit agencies throughout the United States carry passengers who have disproportionately lower incomes than the national average. In the Washington, DC region, for example, a majority of bus riders has low incomes—about ten times the level of people with low incomes in the population overall (Washington Area Bus Transformation Project 2018). A majority of riders on the Massachusetts Bay Transportation Authority, which serves Boston, have household incomes below the regional median; bus riders are especially likely to have low incomes (OPMI Data Blog 2024). Though transit plays an important role in serving residents of all sorts of backgrounds, these trends show that public transportation serves as a particularly essential lifeline for people of limited means.

Understanding the travel patterns of people with low incomes is important from the perspective of affordable housing because those people who live in affordable housing are, practically by definition, more likely to have low or at least moderate incomes. Table 2 documents scholarly findings related to differences in travel patterns between people with low incomes and others, based on their housing patterns.

Though the research on this subject is relatively sparse, the findings that do exist are conclusive, shown in table II-2. People with low incomes take fewer trips overall (Giuliano 2005; Howell et al. 2018). When they take trips, they are much less likely to use a car, to a large degree because their car ownership levels are much lower (Bardaka and Hersey 2019); when households own cars, they are likely to take more trips (Blumenberg and Pierce 2012). Low-income residents are also more likely to travel by transit; in comparing residents near light rail stations in Denver, for example, Bardaka and Hersey (2019) find that

transit mode shares among low-income people were more than three times as high as those of others with higher incomes in the same areas.

Table A-2. Residents with low incomes take more transit trips and drive less

Study	Geography and period	Method	Finding
Synthesis finding 1: Low-income residents have fewer cars, are more likely to travel by transit, and generally take fewer trips			
Bardaka and Hersey 2019	Housing units along Denver light rail lines, 2017	Survey responses for properties along route.	Low-income residents were older and less likely to be working age; nonetheless, the transit trip taking of non-employed affordable housing residents was higher than that of employed market-rate ones. Low-income residents were much less likely to have cars (>50%, vs. <10% among market-rate units). For all trips, low-income residents were 66% transit, vs. 18% for market-rate.
Blumenberg and Pierce 2012	United States, 2009	Examines the National Household Travel Survey to explore relationship between income and car use.	Find that low-income people have fewer trips overall than people with high incomes, though they have many more walking and transit trips. Low-income individuals increase their mobility rapidly with additional income. Car ownership (especially moving from 0 to 1 car) results in higher travel for everyone, especially for low-income adults. [Limitation of the study is that it is examining only person-miles traveled, no other measure of accessibility.]
Chapple et al. 2017	Neighborhoods through Los Angeles and San Francisco metropolitan areas	Compares demographic change in tracts using a model of residential movement, combined with a travel survey.	Low-income residents near and far from transit travel by car at lower rates than high-income households. But low- and high-income residents reduce their driving by a greater degree when adjacent to rail (compared to middle-income residents), with high-income residents changing the most.
Giuliano 2005	United States, 1995	Review of Nationwide Personal Transportation Survey of 42,000 households.	Low-income adults are more likely to travel regularly by public transit, though it is worth emphasizing that most travel, even for them, is by private automobile. Low-income adults are also more likely to take no trips, or shorter trips.
Howell et al. 2018	California, 2010-2012	Uses household travel survey data to perform regression, adjusting for home locations and other local characteristics.	Households with lower incomes have substantially lower trip making. Those living in denser neighborhoods and in multi-family dwellings (not single-family homes) are particularly likely not to drive.
Synthesis finding 2: High-income residents may be particularly susceptible to shifting to biking and walking, not transit			
Danyluk and Ley 2007	Montréal, Toronto, and Vancouver, Canada, 1971–2001	Combination of ethnography and local data collection related to commuting patterns to work.	Higher-income residents in gentrifying areas often use non-car modes, but they often shift to biking instead of transit. They have the tendency to underuse public transportation compared to other users. This is true even after controlling for distance to city center.

There is some evidence that higher-income residents who move into gentrifying areas are more likely to shift out of cars and become walkers or bikers, rather than becoming transit riders (Danyluk and Ley 2007). Even so, there is limited evidence on this front and additional research is necessary to document it. That is particularly true because individuals may choose different modes for different types of trips (e.g.,

for work or for shopping) or at different times (e.g., based on the weather), and they may also choose to take more than one mode of transportation for a single trip.

Why does research indicate that people with low incomes are more likely to take transit and less likely to drive than higher-income individuals? The major explanation is that people with low incomes are less likely to own a car and afford the cost of gas, insurance, parking, tolls, maintenance, and other car-associated expenses. But there are also demographic explanations. People with low incomes—including those who live in subsidized housing—are more likely to be older and face health issues, such as disabilities, making it more difficult for them to drive themselves (Digenis-Bury et al. 2008; Gibler 2003).

As noted, affordable housing is more likely to be located near public transit than other sorts of housing units, suggesting a recognition of the different travel patterns of people with low incomes. Even so, transportation planners do not adequately take into account the differences in travel patterns between people by income when it comes to service modeling and demand estimation (Howell et al. 2018). This could have some substantial impacts. For example, the Institute for Transportation Engineers' handbook estimates that a 300-unit housing project would generate 2,000 average car-based trip ends per day. But evidence suggests that a building occupied by residents with low incomes would more realistically generate about 1,600 car trips; one occupied by residents with extremely low incomes would generate only about 1,000 (Howell et al. 2018). This suggests, similarly, that residents of affordable housing units are likely to have less need for parking than residents of market-rate housing.

In general, transit access is associated with higher home values and rents, especially in walkable neighborhoods

Living near transit conveys accessibility benefits on residents, allowing them to cut down on their transportation expenses by reducing or even eliminating car travel. Transit access can complement affordable housing by lowering housing and transportation costs together. But because transit access has advantages for residents, it sometimes makes housing in the nearby areas more expensive. This may produce counterproductive outcomes, such as situations in which people with low incomes are less able to afford living in homes located near public transportation. This can have two major negative effects. First, it could encourage people with low incomes to move to lower-cost homes further from jobs and other daily needs, which would increase their transportation costs. Or it could require people with low incomes to pay a higher share of their incomes for housing to live in areas near affordable public transportation.

Table II-3 documents key findings related to the links between transit access and housing affordability. First, several researchers show that transit—both existing stations and new investments—is associated with higher housing values in general (Bardaka et al. 2018; Goetz et al. 2010). This conclusion applies to BRT projects as well (Brown 2016), and sometimes manifests in advance of the transit project being completed (Immergluck 2009). In addition, transit investments have been associated with faster growth in real-estate costs than other areas over time (Deka 2017; Pollack et al. 2010).

Second, we document research showing that housing values are particularly likely to increase in transit areas when those communities are dense and walkable. This phenomenon suggests that the perceived or real benefits of transit investments are higher when stations are located in areas where people walk to

stations, rather than drive to them (Atkinson-Palombo 2010; Kahn 2007). These higher housing costs may make cost of living more difficult for families with low incomes, but the savings those households accrue from being able to use public transportation rather than drive may ultimately reduce spending overall (Makarewicz et al. 2020; Renne et al. 2016).

Table A-3. Transit's effects on home values and affordability

Study	Geography and period	Method	Finding
Synthesis finding 1: Access to transit is associated with higher housing costs			
Bardaka et al. 2018	Block groups in the Denver urban region within 1 mile of a bus stop or 10 miles of a 1994 light rail station, comparing outcomes 1990 to 2000	Spatial difference-in-difference model to compare areas impacted by light rail or not.	Finds that the creation of a light rail station is associated with significant increases in housing values in neighborhoods up to one mile from the station. One concern with study methods is that the affected area is essentially the same as central Denver.
Brown 2016	Tracts in Los Angeles within 5 miles of Orange Line BRT, 2000–13.	Compares neighborhood demographics near and far from BRT stations.	Finds that BRT was associated with rising home values and rents in areas within a half mile. Low-income neighborhoods were more likely to see an effect. One concern with study worth noting is that home values in five-mile range (the control group) include neighborhoods in the Hollywood Hills.
Deka 2017	Tracts in areas near New Jersey commuter rail stations, 1990–2013	T-tests of means and regression evaluations comparing tracts with or without commuter rail stations.	On average, tracts near transit have higher home values and experience a greater increase in home values over the study period.
Goetz et al. 2010	Neighborhoods around Hiawatha Light Rail Line in Minneapolis, 1990–2010	Uses hedonic model of single-family and multi-family residential properties near transit, compared to control group.	Completion of light rail line resulted in positive impact on home values in station area. There was also a higher degree of new residential investment in those areas.
Ibraeva et al. 2020	Global	Review of scholarship around the world related to TOD.	In general, the presence of transit and TODs increases property values. The quality of the built environment plays a major role in impacting outcomes.
Immergluck 2009	Neighborhoods near the Beltline project in Atlanta, 2000–06	Hedonic model of property prices, combined with buffer based on distance to Beltline.	Home values increased in anticipation of a combined trail and light rail projects. This occurred to a particularly significant degree in the low-income, southern part of the district.
Lin and Chung 2017	Neighborhoods in Taipei, Taiwan, 1996–2013	Compares neighborhoods that received a new metro station with others.	In core city areas, arrival of new metro station is associated with higher home values.
Pollack et al. 2010	Neighborhoods served by new rail transit stations throughout the US, 1990–2000	Comparison of neighborhood demographics over time.	Housing cost grew faster in rail transit-served areas than elsewhere in region. In transit-served neighborhoods, rent increased faster than in the encompassing metro area in 74 percent of them nationwide; home prices increased faster in 88 percent of them.

Study	Geography and period	Method	Finding
Synthesis finding 2: Transit's impacts on housing value are higher in walkable neighborhoods with higher densities, but savings in transportation costs may allow families to pay for higher housing costs			
Atkinson-Palombo 2010	Neighborhoods near light rail in Phoenix, 1995–2007	Uses hedonic estimates of sales data to evaluate effects of transit adjacency.	Home values in mixed-use, walk-and-ride neighborhoods are 6 percent higher for single-family homes, and 20 percent higher for condos (this figure increased with zoning enabling it)
Kahn 2007	Tracts in 14 cities where rail transit was built in the United States, 1970–2000	Compares changes over time in tracts with rail transit and other similar tracts in the same metropolitan areas.	Tracts in low-income neighborhoods with a new walk-and-ride station experienced increased home values, while those with new park-and-ride stations did not. But differences abounded by city.
Makarewicz et al. 2020	United States, 2015, at the block group level	Review of data from Panel Survey of Income Dynamics, using regression analysis.	Households in locations with good transportation access to opportunity spend substantially less on transportation—enough to offset higher housing costs. Benefits are particularly strong from walkable blocks and good transit. Savings are not big enough for those with very low incomes. Argues that its small-geography data is more effective than Smart and Klein's 2018 data.
Renne et al. 2016	Fixed-route transit stations, United States	Classifies stations by walkability, density, and neighborhood amenities. Compares "TOD" station areas versus non-TOD.	TODs—defined as higher density with more amenities—are more expensive to buy and rent, but more affordable than neighborhoods with lower densities and few nearby amenities. Finds that TODs have lower median household incomes and a higher rentership share; yet those areas had increases in rent and home values more rapidly than non-TOD station areas.
Contrasting finding 1: Transit has negative impacts on housing values			
Bowes and Ihlanfeldt, 2001	Properties near rapid transit stations in the Atlanta region, 1991–4	Creates a hedonic model for single-family home sales values that incorporates crime, retail activity, and transit access.	Finds that stations within a ¼ mile are associated with lower values; being a mile away from a station is associated with higher values, especially in higher income neighborhoods. Crime and poverty sometimes associated with transit can result in outcomes that are unattractive to investors and capital.
Dong 2017	Suburban neighborhoods in the Portland, OR metropolitan area, between 1990 and 2014	Difference-in-difference using propensity score matching to compare neighborhoods with and without new rail access.	Potentially negative effects on housing value; no effects on affordability.
Contrasting finding 2: Families who move into TOD areas do not ultimately save much on transportation			
Smart and Klein 2018	Tract level data across the United States, 2003–13	Review of data from Panel Survey of Income Dynamics (actual individual expenditure data), measuring the number of jobs accessible by transit in 30 minutes, normalized to a regional average.	Affordability lit may overstate the benefits of TOD. Though TOD area residents spend less on transportation than others, that is largely because of lower incomes; when families move into TODs, they do not systematically reduce transportation expenditures. That said, this study does not take into account other types of accessibility and relies on large tracts.

Some researchers, even so, have documented different trends. Dong (2017), for example, shows potentially negative effects on housing value due to adjacency with transit. One explanation may be a concentration of higher crime rates and more people living in poverty in areas near stops, though the evidence for this is old and may no longer apply (Bowes and Ihlanfeldt 2001). Moreover, while transit can save costs for families who can get to the destinations they need without driving, transit adjacency may have little benefit for those who need to get to areas hard to get to by transit (Smart and Klein 2018). In other words, transit adjacency is only useful if that transit provides accessibility to destinations.

Relationships between transit access and gentrification and displacement

Next, we consider the scholarship on the links between transit access and trends related to gentrification and displacement. In theory, if proximity to transit is often associated with higher housing costs, those costs could make it difficult for people with low incomes to move into the neighborhood—and they could make it more difficult for people with low incomes who already live there to stay. These outcomes, if they occurred, would reduce the ability of people with low incomes—who arguably need access to transit most—from being able to live in transit-rich areas.

The definition of gentrification has been subject to years of debate. Nonetheless, Landis' (2016) work on what he describes as substantial neighborhood socioeconomic change (SNSEC) provides context for exploring this issue. Across the United States, the primary form of SNSEC has been neighborhood decline—in other words, the inverse of gentrification. Landis argues that SNSEC can be measured using the following metrics, spanning information about people, society, and the built environment:

- Changes in aggregate sociodemographic and economic conditions.
- Changes in the physical, occupancy, and financial characteristics of the building stock.
- Information about newcomers to an area, such as people, households, and businesses.
- Physical and capital flows, e.g., building permits and prices.

Some neighborhoods may experience changes in these metrics that are associated with gentrification, such as increases in share of the population that is white, increases in household incomes, improved building stock, higher-cost housing, an increase of newcomers to an area, and expanded investment. Padeiro et al. (2019: 735) define gentrification as "a broad upgrading process whereby a neighbourhood's socio-economic composition changes to a greater degree than that of nearby areas over a relatively short time period, as wealthy and highly skilled workers proportionally increase by outbidding poorer residents for housing." They note that gentrification may be measured by changes in rent income, ethnicity, education, age, and occupation, as well as house prices, tenure, and rent levels.

When neighborhoods undergo gentrification, their residents may be subject to displacement. Areas adjacent to transit lines may be particularly impacted by this trend, since those are more likely to be occupied by renters, who are more likely to be displaced (Deka 2017). Even so, few studies thus far have found a specific link between gentrification and displacement, despite the fact that this is a concern often

raised by community stakeholders in planning processes (Rayle 2015). Ellen and O'Regan (2011) do find that the out-migration of poor and renter households from gentrifying neighborhoods is no higher than in other communities. Additional research is needed to understand this relationship.

Researchers examining gentrification and displacement typically explore conditions within specific neighborhoods. As such, they may be able to argue, for example, that gentrification has resulted in a neighborhood becoming more or less racially segregated. But segregation and other aspects of human geography can play out over multiple scales (Iver et al. 2023). People's experience is not confined just to the neighborhoods where they live, but also occurs in the areas where they work, where they go to school, and even where they take transportation. As such, further research is needed to explore these more diverse attributes of peoples' lives.

Finally, it is difficult to measure the specific gentrification effects of TOD because the trends that cause TOD to be built in the first place are often the same as those causing gentrification. This means that they are endogenous to one another; we cannot separate the cause and effect from one another (Padeiro et al. 2019). Nonetheless, in table II-4, the research team summarizes key conclusions from a series of studies that parse out the links between transit access and gentrification and displacement.

A large set of research has identified that transit access is generally associated with increasing local incomes and educational achievement. This may occur after a new station opens (Bardaka et al. 2018; Lin and Chung 2017) or in areas where transit already exists (Chapple 2009; Grube-Cavers and Patterson 2015; Pollack et al. 2010). There is disagreement about whether these effects are more likely to occur in already wealthy neighborhoods (Heilman 2018) or low-income neighborhoods (Nilsson and Delmelle 2018). These changes coincide with investments, such as TODs, that also increase neighborhood housing costs (Chapple et al. 2017). There is little consensus on transit's impacts on the share of residents who are people of color in the surrounding area, with some studies showing that transit areas became *more* diverse over time (Hess 2020). Walkable neighborhoods near transit appear to experience greater levels of gentrification (Kahn 2007).

One research result of particular interest to the question of the link between transit and affordable housing is Zuk et al.'s (2015) examination of neighborhoods with LIHTC housing, near and far from transit stations. They find that those communities with transit access are more likely to experience gentrification compared to other neighborhoods without it, even though both types received investment in new LIHTC projects. This suggests that while affordable housing does not generate neighborhood upward changes, transit access does.

Table A-4. Transit's and TOD's effects on gentrification and displacement, defined in terms of resident characteristics

Study	Geography and period	Method	Finding
Synthesis finding 1: Transit access is generally associated with increasing local incomes and educational achievement. Mixed effect on people of color.			
Bardaka et al. 2018	Block groups in the Denver urban region within 1 mile of a bus stop or 10 miles of a 1994 light rail station,	Spatial difference-in-difference model to compare areas impacted by light rail or not.	Finds that the creation of a light rail station is associated with significant increases in household income in neighborhoods up to one mile from station, though they do not find statistically significant increases in

Study	Geography and period	Method	Finding
	comparing outcomes 1990 to 2000		educational achievement or managerial occupations. Concern is that the affected area is essentially the same as central Denver.
Brown 2016	Tracts in Los Angeles within 5 miles of Orange Line BRT, 2000–13.	Compares neighborhood demographics near and far from BRT stations.	Finds that BRT was associated with increasing educational attainment of residents in areas within a half mile, though racial composition remained static overall.
Chapple 2009	Neighborhoods throughout the Bay Area, California, 1990–2000	Compares demographic change in tracts.	Found that only 7.3 percent of tracts in the region gentrified, but more than 80 percent of these had rail transit stations. Gentrifying neighborhoods had far higher transit commute shares, on average. Even so, some tracts with stations became lower income.
Chapple et al. 2017	Neighborhoods through Los Angeles and San Francisco metropolitan areas	Compares demographic change in tracts using a model of residential movement, combined with a travel survey.	Neighborhoods with TOD experience increases in housing costs that make the neighborhood less stable, resulting in the loss of low-income households. Mixed evidence about whether this change results in changes in commuting patterns.
Grube-Cavers and Patterson 2015	Tract level data in Montreal, Toronto, and Vancouver, 1961–2006	Uses a survival analysis approach to test the influence of new rail transit on gentrification.	Rail transit access had gentrification effects in Montreal and Toronto, but not Vancouver
Heilman 2018	Neighborhoods in Dallas, 2000–10	Compares changes in demographics in neighborhoods with rail access and those without it, using a difference-in-differences model.	Finds that median and mean family income increased in areas with rail lines. Finds that the major change was a reduction in share of families near middle of income distribution, increase at the high end. Richer neighborhoods saw a larger increase in income. Overall, segregation increased more strongly, both by income and by race.
Hess 2020	Block groups around light rail in Seattle, 1980–2014	Difference-in-difference models comparing neighborhoods with and without rail access.	Shows that neighborhoods in the city with rail service have a higher white population share (and lower Asian and Hispanic shares), but that those in more suburban areas saw more racial diversity, especially when it came to Black population shares.
Lin and Chung 2017	Neighborhoods in Taipei, Taiwan, 1996–2013	Compares neighborhoods that received a new metro station with others.	Finds that the share of college graduates increases in areas that receive a new metro station. Increased real-estate development also occurs, particularly in outer city areas.
Nilsson and Delmelle 2018	Neighborhoods across nine U.S. metropolitan areas, 1980–2010	k-means clustering approach used to construct neighborhood typologies, then examination of change over time through transition probabilities.	Poor neighborhoods are more likely to experience gentrification after transit station opening; wealthy neighborhoods are most likely to experience densification. These trends apply to income, but not to racial change, however.
Pollack et al. 2010	Neighborhoods served by new rail transit stations throughout the US, 1990–2000	Comparison of neighborhood demographics over time.	Income grew faster in rail transit-served areas than elsewhere in the region. About half of neighborhoods experienced an increase in white population; the other half experienced a decline. But income increased faster than in the surrounding metro areas in 3/5 of station areas. In-

Study	Geography and period	Method	Finding
			migration also increased more rapidly in station areas.
Zuk et al. 2015	Neighborhoods near transit stations and LIHTC housing projects, United States, 2000–06	Descriptive comparison of LIHTC neighborhoods by access to transit.	Neighborhoods where there were both LIHTC projects and transit investments were more likely to experience the pressures of gentrification, in terms of reduced poverty rate, increased incomes, and fewer people of color, than neighborhoods with only LIHTC.
Synthesis finding 2: Walkable neighborhoods are associated with higher rates of gentrification than low-density areas			
Kahn 2007	Tracts in 14 cities where rail transit was built in the United States, 1970–2000	Compares changes over time in tracts with rail transit and other similar tracts in the same metropolitan areas.	Communities with walk-and-ride stations experienced greater gentrification, such as in terms of college education, than park-and-ride stations (which were sometimes associated with fewer college-educated people). This is particularly true in neighborhoods with above-average college education levels.
Contrasting finding 1: Gentrification and other change are sometimes supported by local residents			
Fan and Guthrie 2012b	Four rail and BRT corridors in the Twin Cities, 2010	Survey of residents living in neighborhoods experiencing change near transit.	Residents experienced positive neighborhood changes in general as a result of transit investments. Black people, immigrants, transit users, and new residents were more positive than white people, nonimmigrants, and car users. Asian residents had particularly negative impressions.
Contrasting finding 2: Many transit neighborhoods saw declines in income and no effects on population of color			
Baker and Lee 2019	Neighborhoods across 14 urban areas in the United States where light rail stations opened in the 1980s and 1990s, with data through 2010	Regressions documenting changes in neighborhood demographic characteristics, based on whether they received a new light rail station.	No evidence for stations causing gentrification, though results varied by region. Gentrification was associated with TOD in the Denver and San Francisco regions, but countergentrification occurred in the Buffalo, Los Angeles, and Portland regions (which may be a result of local policies to encourage affordable housing near transit).
Deka 2017	Tracts in areas near New Jersey commuter rail stations, 1990–2013	T-tests of means and regression evaluations comparing tracts with or without commuter rail stations.	No demonstration of "undesirable" changes in population demographics, particularly when it comes to changes in people of color.
Dong 2017	Suburban neighborhoods in the Portland, OR metropolitan area, between 1990 and 2014	Difference-in-difference using propensity score matching to compare neighborhoods with and without new rail access.	Mixed effects on changes in income, with some neighborhoods actually seeing faster declines in income than control group; no effects on minority population; and mixed effects on tenure.
Padeiro et al. 2019	Mix, with papers published from 2000–18.	Review of 35 quantitative research papers on gentrification outcomes.	Argues that many of the studies identifying gentrification may be highly questionable. Gentrification is more likely to occur in the context of existing local dynamics, the built environment, and policies. Studies that analyzed just one line were more likely to find gentrification (6 of 7 studies reviewed); similar for studies with high bias avoidance

Study	Geography and period	Method	Finding
			scores. It was a more complicated story when examining multiple lines or multiple cities. In general, though, there was a mix of findings between a gentrification impact, no impact, and variable impacts.

Table 4 notes some contrasting findings—studies that make the opposing claims as a majority of the rest of the literature. First, while gentrification is often opposed by residents of communities who worry about the changes that may occur because of it, Fan and Guthrie (2012b) find in a study of the Twin Cities that a majority of residents supported neighborhood changes associated with new transit lines. Second, a series of researchers find that transit neighborhoods have not experienced neighborhood gentrification. Deka (2017) finds no effect of transit access on the share of people in a neighborhood who are of color; Dong (2017) identifies declines in incomes in some suburban neighborhoods. Baker and Lee (2019) emphasize that conditions in transit neighborhoods are dependent on the metropolitan region where they are located; some regions experience upward change and others not.

Barriers to TOD with a high level of affordability

A host of barriers impede the ease and proliferation of equitable TOD. Some of these affect TODs generally, while others exist uniquely with respect to implementing high levels of affordability. These barriers can be framed categorically in terms of 1) cultural and social barriers; 2) barriers related to planning processes and requirements; 3) financial barriers; and 4) barriers associated with transit service. Table II-5 summarizes research on these hurdles.

With respect to **cultural and social barriers**, scholarship reveals that car culture and identity prejudices hinder the integration of affordable housing and transit prioritization. Tan et al. (2014) finds that, in periods during which pro-car policies (e.g., free parking) are implemented, it becomes harder for developers to include more affordable units in mixed-income TODs. This is due, in part, to the views of lenders and neighborhood residents that larger amounts of parking need to be provided. The research team notes that the fervor of these views and the associated push-back against projects lessens during implementation periods of car-limiting policies (e.g. restrictions on second vehicle ownership, high costs for second parking permits, and drive-day limitations).

The role played by racial and class-based prejudice—common throughout U.S. history (Taylor 2019)—in resisting affordable TOD projects is also not to be ignored. Equitable TOD assures mixing of people of different incomes. Through an examination of TOD efforts in the Chicago and Washington, DC metropolitan areas, Lung-Amam et al. (2015) find that racial and class-based prejudices serve as the undercurrent of resistance to projects centering affordability. Noland et al. (2017) identify similar outcomes in their study of transit villages throughout New Jersey. Relatedly, Barklage's (2013) work unearths that this prejudice is regularly dressed up as resistance to upzoning and densification, particularly in suburban neighborhoods near park-and-ride commuter stations.

Barriers from the planning side of development processes abound. Lack of interjurisdictional coordination, ill-equipped trip models, and onerous planning requirements often hinder TOD

implementation, both with and without high levels of affordability. Lack of institutional coordination, especially when bringing together multiple local jurisdictions, has proven challenging (Garde et al. 2013; Staricco and Brovarone 2018). Tan et al. (2014) stress that fundamental to this problem is the proliferation of uncoordinated actors involved in management of stations and surrounding areas.

Garde et al. (2023) note that uncertainties inherent in the approvals process, such as public meeting requirements, can delay project approval. Nedwick and Burnett (2015) argue that severe inflexibility in planning requirements disincentivize integrating affordable units into TOD, with developers choosing faster, clearer approvals processes that are possible with just market-rate units. As noted, some zoning rules fail to account for differences inherent in affordable versus market-rate housing, such as in terms of minimum parking requirements or transportation impact fees, which do not adjust for the lower driving rates of residents with low incomes (Howell et al. 2018; Weinberger et al. 2019). This can result in affordable projects becoming more expensive to complete and less feasible.

Financial barriers are perhaps the most difficult to overcome for affordable TOD projects. A number of scholars stress that TOD investments are hampered by a lack of dedicated funding and the perception by lenders that they are high risk, particularly TODs with a high level of affordable housing on site (Barklage 2013; Cervero and Dai 2014). Though some municipalities provide dedicated TOD funding programs, those offerings are few and far between, with significant program administration capacity requirements for fund applicants and recipients, which may limit their broad effectiveness (Reconnecting America 2010).

It is also true that traditional approaches to mixed-use development, in which ground-floor commercial rents cover a high share of development costs, may be ill-suited to TOD with high affordability as retailers that can afford higher rents may not well-serve a lower-income client base (Dwight 2017). Project sponsors also struggle to identify funding sources for supportive infrastructure such as public amenities, that accompany TODs (Belzer and Autler 2002).

Finally, research suggests **the T in 'affordable TOD' is often ignored, in part because of changes in public perceptions**. Boelleter et al. (2021) note that the desirability of being located near transit may be waning. In cities across the US, transit ridership was decreasing prior to the Covid–19 pandemic; transit systems continue to struggle with recovery (Freemark and Rennert 2023). This may contribute to lessening confidence in TOD as a planning strategy. Moreover, though transit systems are most likely to experience increased ridership with improved quality of service, there are limited funds available for the operational enhancements needed to make transit attractive enough to residents to encourage relocation to TODs and to, in turn, incite increased ridership (Cervero and Murakami 2009; Yang et al. 2016). There are few mechanisms for developers to contribute to improved service (Nelson and Niles 1999), though there are sometimes opportunities for developers to fund capital improvements, such as bus shelters or new subway station entrances, in coordination with projects. Mathur and Gatdula (2023) note that poor transit service may contribute to localities ultimately failing to keep living costs affordable even for those in transit-proximate subsidized housing; if transit fails to meet their travel needs, increased vehicle use may result.

Table A-5. Barriers to equitable TOD

Study	Geography and period	Method	Finding
Cultural and social barriers. Synthesis finding: Car culture and identity prejudices hinder affordability integration and transit prioritization			
Tan et al. 2014	Netherlands, multiple regions nationwide covering policies that extend back to the 1970s	22 interviews and 2 focus groups (24 participants) with TOD stakeholders from public and private sectors across transportation and land use, plus policy analysis.	Find that pro-car policies can make implementation difficult. Authors argue that in periods of pro-car policies, it may be harder for developers to include more affordable units as views that space need by allocated for greater amounts of parking may be strong.
Lung-Amam et al. 2015	US, nationwide with specific focus on the metro areas of Chicago, IL and Washington DC since 2005	Case study analysis.	Equitable TOD assures mixing of people of different incomes. Given U.S. histories of stringent segregation, this has implication, in many metro-areas related to racial diversification as well. In many cases, racial and class-based prejudices serve as the undercurrent of resistance to equitable TOD among the public.
Noland et al. 2017	Four transit villages across New Jersey between 2011 and 2012 served by two different transit providers and four different rail lines	14 interviews with planners and developers and focus groups with 38 participants who were residents of the four transit village neighborhoods.	Find that resistance from neighborhood residents is associated with the belief that increasing density as well as developing desirable mix-use areas will worsen neighborhood traffic despite the heightened walkability and the proximity to transit service. Authors also find that anti-densification is often laced with racialized and class-based undertones.
Planning barriers. Synthesis finding: Interjurisdictional coordination, ill-equipped trip models, and onerous planning requirements are major barriers to TOD, both with and without a high level of affordability.			
Garde et al. 2023	10 transit stations in Los Angeles and Orange counties, California. Interviews conducted in 2022 and 2023	Interviews with planners, policymakers, and developers involved in achieving affordable housing.	Find that TOD plans typically fail to offer a vision for an inclusive community in their story telling and marketing elements (i.e. narrative crafting). Additionally, onerous requirements for securing subsidies, uncertainties in the approval process, and high competition for parcels from market-rate housing developers jeopardize project approval.
Staricco and Brovarone, 2018	Global, with Netherlands and Italy as two nation-level case studies	Review of practices and case study analysis.	Highlight that a lack of institutional coordination, especially when bringing together several jurisdictions to form a regional planning effort, serves as a major barrier. Especially when jurisdiction have different determinations of affordability.
Weinberger et al. 2015	16 sites in Washington DC (2012 – 2014)	Field counts compared against trip generation analysis using ITE model.	Authors raise questions about the reliability of ITE models and find that they do not match peoples' actual travel. Common trip-gen methods do not reflect the reality that people bike, walk, and take transit rather than drive for many trips. This failing is even greater when it comes to modelling travel behavior of low-income travelers.
Nedwick and Burnett 2015	15 U.S. states between 2003 and 2013	Interviews with over 100 housing policy makers, developers, and transit policy	Find that most incentives from the public sector – e.g. existing development bonuses, subsidies, and exemptions, tax credits – are still not enough to make the inclusion of affordable

Study	Geography and period	Method	Finding
		experts. Hedonic regression of 'incentive' policy elements modeled against affordable unit inclusion.	housing near transit financial worth undertaking for developers. Authors stress the intense disincentive effects caused by minimum parking requirements.
Financial barriers, synthesis finding: Affordable TOD is hampered by a lack of dedicated funding and perceived high risk from lenders.			
Barklage 2013	Metro areas of Atlanta, GA, Denver CO, Portland, OR, San Francisco, CA, and Washington DC	Case study analysis.	Finds that lenders view TOD as a riskier type of development style than other types – in part due to comparatively low parking creation – and are reluctant to fund TOD projects as a result. This fear of low returns on investment is heightened when unit affordability is incorporated into the project. Also finds that large enough parcels along existing rail lines to make TOD financially appealing are a rarity in many U.S. metro area weakening developer interest.
Cervero and Dai 2014	27 global cities between 2005 and 2014	Survey analysis and predictive modelling.	Focusing on BRT, authors find that the lack of a dedicated funding source tops the list of barriers to affordable TOD implementation.
Howell et al. 2018	State of California between 2010 and 2012	Evaluation of development review requirements and the predicted travel behavior measures that inform them against realized travel behavior as determined via the California Household travel survey.	Despite the fact that low income people travel a lot less than higher income, market-rate housing residents, they are subject to the same amount of impact fees. This results in over-assessments of transportation impact associated with developing affordable housing.
Dwight 2017	Chicago metro area between 1990s and 2015	Case study analysis of TOD plans.	Find that traditional approaches to mixed use development, in which ground floor commercial rents functionally subsidize some of the cost of housing, are particularly ill-suited to equitable TOD as retail that can afford higher rents may not well-serve a lower-income client base.
Belzer and Autler 2002	US, nationwide from 2000 to 2002	Combination of review of scholarship and TOD plans	Even in cases where a strategy exists for financing the basic components of a project, a defined funding source is rarely available to cover many of the "place making" features that smooth the transition between place and transit node. Authors find that this holds particular true for mixed-income, partially affordable TOD efforts.
Transit service barriers. Synthesis finding: The T in 'affordable TOD' is going underattended to; this may distinctly impact low-income residents in cases where affordability does get integrated into TODs and can impact the final price tag for TOD developers.			
Nelson and Niles 1999	US, nationwide 1990 to 1998	Review of literature and examination of degree to which developments were intentional about adopting New Urbanist ideals/practices.	The mode choice factors that impact transit selection beyond residential proximity apply in TODs just as they do in dense urban cores. Authors stress that planners and developers of TOD have demonstrated a lack of attention to this reality resulting in unattractive transit access and service infrastructure impeding TOD success. They also suggest that there are not readily available mechanisms for developers to

Study	Geography and period	Method	Finding
			directly contribute to transit operation budgets specific to TOD sites in many cases.
Boelleter et al. 2021	Perth, Australia in 2013	13 semi-structured interviews with participants involved in TOD conceptualization, planning, design, and/or development.	Authors note that year-over-year waning in transit patronage has shaken confidence in the TOD model among many. It has also contributed to continued divestment from transit in the public sector contributing to ill-maintain infrastructure. This then increases the investment needed from the private sector for attractive placemaking which further increased overall project and makes integration of affordability a greater lift.
Yang et al. 2016	All metro stations in Shenzhen, China between 2000 and 2014	Regression analysis (spatial lag model).	Findings suggest that infill stations in denser areas with a greater number of proximate transit connections and higher service frequencies might be more expensive to develop in the short run, but offer greater propensity for land value capture and commercial desirability that can substitute affordable housing sustainably in the longer run.
Mathur and Gatdula, 2023	Nationwide, 2022–2023	Survey of 30 of the largest 101 transit agencies in the U.S. plus review of the TOD barriers literature.	Low levels of service, poor frequency in particular, significantly hold TODs back from achieving its objectives. Vehicular travel still, for many TODs, continues to have performance competitive advantage. Authors find that even in cases where this does not hinder eTOD development, it contributes to a failing to keep living costs affordable even for those in subsidized housing, as their vehicular needs may increase (this could be carpooling, ride-hailing, etc.).

Best practices to add affordable housing near transit and mitigate potential displacement

There have been a wide array of efforts made to integrate affordable housing and transit access, shown in table II-6. The federal government requires jurisdictions that receive funding (generally states, localities, and governmental agencies) to develop plans, many of which demonstrate policymakers' interest in, if not commitment to, supporting affordable housing in areas of high transportation accessibility. Examples of such plans include U.S. DOT-mandated Long-Range Transportation Plans and Transportation Improvement Programs; Federal Transit Administration (FTA)-required Coordinated Public Transit-Human Services Plans; HUD-required Consolidated Plans, Action Plans, Public Housing Authority Plans; and Internal Revenue Service-required Qualified Allocation Plans (for LIHTC allocations). In guidance for developing these plans, the federal government sometimes stated some interest in promoting TOD principles. That emphasis, according to Boarnet et al. (2017), often takes the form of "prioritizing," "encouraging," "facilitating," "capacity building," and "supporting" public and private stakeholders. Because of the lack of benchmarking associated with these, it is difficult to say the degree to which they have successfully manifested in affordable TOD; the "support" provided by these programs may be insufficient to incentivize affordability in areas whose value has been increased by transit proximity.

The FTA Pilot Program for TOD Planning, updated in 2023, has a more clearly defined commitment to these outcomes. The program establishes the opportunity to receive full federal planning funding for projects that focus on connecting affordable housing and transit. Projects can center, among other things, reducing regulatory barriers to affordability, updating parking standards, and providing strategies to address homelessness. In fiscal year 2023, this program awarded $17.6 million in the form of 100 percent federal support to 20 projects in 16 states. Though it is too early to determine the extent to which this planning support secures affordability, this program is promising.

The federal government has also established new principles for supporting the development of affordable housing projects in areas directly adjacent to transit stations (González-Hermoso and Freemark 2023). The FTA's interim asset disposition guidance allows transit agencies to transfer surplus property purchased with federal funds to municipalities or nonprofit developers at no cost if that land is used for affordable housing (rules require at least 40 percent of units to be below 60 percent of AMI, or 20 percent below 30 percent of AMI). Meanwhile, the federal government's RRIF and TIFIA programs have been altered to encourage the distribution of low-cost loans to TOD projects.

Wanting to get the most out of existing federal programs, some scholars have explored ways to improve the LIHTC program. They find that use of the basis boost (a tool for improving the financial feasibility of developments with higher-than-average costs) to support developments near transit is uncommon. They recommend that housing agencies, which have the discretion to increase a development's eligible basis by up to 30 percent, expand the use of this option and therefore enable more equity to be raised than would have been possible without the boost and reducing the amount of debt and gap funding needed (Shelburne 2011). Others advise that housing agencies more stringently limit the number of points developments can receive for cost efficiency when determining LIHTC allocations, so as to not excessively overshadow other important policy priorities (Nedwick and Burnett 2015).

Table A-6. Best practices for incorporating affordability into TOD, with the goal of avoiding displacement

Study	Geography and period	Method	Finding
Federal level efforts. synthesis finding: To date, access to LIHTC support is the most widely used federal strategy for facilitating affordable housing creation near transit. Still, it remains underutilized.			
FTA Pilot Program for TOD Planning (Federal Transit Administration 2024)	Nationwide, updated in 2023	FY2023 awards entailed $17.6 million awarded as 100% federal support to 20 projects in 16 states.	FTA established the opportunity to receive full federal support for projects that focus on connecting affordable housing and transit. Projects could focus, among other things, reducing regulatory barriers to affordability, updating parking standards, and providing strategies to address homelessness.
Nedwick and Burnett 2015	15 U.S. states between 2003 and 2013	Interviews with over 100 housing policy makers, developers, and transit policy experts. Hedonic regression of 'incentive' policies modeled against affordable units.	Authors focus on the federal Low-Income Housing Tax Credit program. They recommend balancing cost containment in the LIHTC Program so that higher cost developments are not put at a disadvantage. Policies like caps on development costs and incentives for cost efficiencies can make it difficult for transit-oriented developments to compete for 9% LIHTCs.

Study	Geography and period	Method	Finding
Shelburne 2011	Nationwide, 2008 to 2011	Landscape analysis of all 50 states' application of LIHTC programming, and review of plans.	Looks at the ways that some states have used the LIHTC basis boost for transit-proximate developments. Authors identify basis boost as a tool for improving the financial feasibility of developments with higher-than-average costs (which is typically the condition of TOD sites). Housing agencies have the option to increase a development's eligible basis by up to 30 percent, enabling the developer to raise more equity than would have been possible without the boost.
State level efforts, synthesis finding: *State-level measures for affordability as it relates to transit access are not particularly common, but those that exist and have impact are intertwined with other initiatives (e.g. environmental sustainability).*			
Boarnet et al. 2017	Greater Los Angeles metro area, policies in place at time of writing (2016-2017)	Policy review, landscape analysis.	Authors note the effectiveness of combining funding strategies for affordable housing in TOD with environmental goals. Example of California Greenhouse Gas Reduction Fund— revenues from state cap and trade auctions, funds Affordable Housing and Sustainable Communities Program— is discussed. This fund explicitly prioritizes producing and preserving affordable housing near transit.
Hersey and Spotts 2015	Nationwide from roughly 2005 to 2015	Landscape analysis of practices.	eTOD fund created by Colorado Housing and Finance Authority in 2010. Denver contributed $2.5 million in top-loss capital. Funded totaled $15 million. In 2014, that fund expanded to $24 million for non- and for-profit development to be used across a seven-county metro region.
Thomas and Bartolini 2017	11 case studies from multiple countries	Meta-analysis.	Find that political stability at the national level, relationships between actors in the region, interdisciplinary teams used to implement TOD, and public participation are the most significant success factors in TOD implementation.
Kaniewska et al. 2024	107 TOD projects across 24 rail-served regions across the US, 1992 to 2021	Landscape analysis using interviews, housing price data via web-scraping, use of HUD-published AMIs, and review of development plans.	Find that the overwhelming majority of regulatory and incentive-based interventions in support of affordable TOD exist at the city and county levels. Of the 24 regions studied, only 2 have state-level affordable housing measures. Authors also critique the voluntary nature of many approaches to creating affordability. However, they find that few regulatory measures are actually enforced. Making a larger share of total affordable TOD units the result of voluntary measures.
Local and regional level efforts			
Parkhurst 2012	San Francisco and Denver, 1930s to 2010	Landscape analysis, historical contextualization, and case studies.	Author stress funding via public-private partnership. Highlights the $50 million Bay Area Transit-Oriented Affordable Housing Fund and the $15 million Denver TOD Fund designed to assist low-income families reduce their transportation costs. Argues that the success of these efforts was associated with their work with CDFIs.

Study	Geography and period	Method	Finding
Sandoval 2016	Two TODs in Boyle Heights neighborhood in Los Angeles looking at neighborhood data from 1990 to 2015	Comparative case study analysis and interviewees with TOD neighborhood residents.	Concludes that TODs most effectively meet the objectives of eTOD when the development process features the inclusion of existing communities in a culturally competent way that includes community decision-making in placemaking project elements.
Bodaken and Nedwick 2012	Denver, CO, Seattle, WA, Washington DC, and Atlanta, GA (2009 to 2012)	Case studies.	Stresses the underutilization of preservation funds for affordable TOD facilitation. Cites Green Preservation of Affordable Transit-Oriented Housing (GreenPATH) in DC as a successful example of this application.
Quigley 2010	Atlanta, GA, Denver, CO, Seattle, WA, and Washington DC from 2000 to 2010	Case studies.	Author highlights strategies successfully used across the case study cities including: CDCs and tenant organizations utilizing pooled financing; cities utilizing Land Banking Authorities to hold a manage land or buildings for non-profits and government agencies for up to five years tax free with the option to clear delinquent taxes; utilizing Neighborhood Stabilization Programming specifically for the preservation of multi-family housing in transit corridors.
Kralovich 2012	Oakland, CA, Los Angeles, CA, and Denver, CO pulling examples from 2000 to 2012	Case studies.	Link equitable TOD efforts with other citywide and regional equity initiatives; TOD overlay zones allow for much needed zoning flexibility to better match the unique needs and behaviors of transit-proximate residents; consider housing TOD funds at the country-level as it better aligns with the scale of impact of the transit system; enforcement of rent stabilization ordinances where they exist/apply.
Strategies for transit agencies, synthesis finding: *Transit agencies are taking actions that are directly resulting in a greater number of affordable units in station areas. They are setting regulations, partnering with private sector actors, and committing to anti-displacement*.			
Fesler 2021	Seattle, WA. Program adopted in 2018	Program approach: community collaboration and set affordability minimums.	Sound Transit Affordable Housing program prioritizes the use of mid-construction staging space and other transit agencies land holdings not actively used to run service for community-informed development. This includes affordable housing (at 80% AMI) but is not limited to it. It also supports small and community owned businesses, open space development, and more.
Sound Transit Transit-oriented Development (Sound Transit 2024)	Seattle metro area, presently ongoing	Public-private partnership.	Sound Transit has committed $4 million per year for 5 years to a revolving loan dedicated to creating affordable housing near its light rail stations. This involved partnering with the Local Initiatives Support Corporation (LISC) to run an affordable needs assessment. Sound Transit has also partnered with Amazon to provide financing to build up to 1,200 new affordable housing units on Sound Transit surplus properties near light rail stations; $100 million from Amazon to developers to help create and expedite development. 76% of the 3,300 units built as a part of this effort have been affordable.
LA Metro MATCH (MATCH 2024)	Los Angeles County, CA, ongoing	Public-private partnership managed by a	LA Metro: 35% of LA Metro's portfolio is targeted to include housing for 60% or less AMI; Metro Affordable Transit Connection Housing (MATCH) fund is joint venture with philanthropic foundations, LA Metro, and

Study	Geography and period	Method	Finding
		consortium of three CDFIs.	three national community development financial institutions. As of 2017, MATCH had provided $75 million in loan capitalization support for long term affordable housing within half a mile of transit nodes.
CapMetro ETOD Policy Plan (City of Austin 2023)	Austin, TX, plan is ongoing/presently active; engagement occurred between 2021 and 2022	Displacement risk assessment, station-area vulnerability index, and resultant prioritization plan and policy packaging.	Categorizes every rail and BRT station as one of its predefined eTOD typologies. These are determined by how a station area's population is changing (growing or shrinking over time), the degree to which it is vulnerable to displacement pressures, and the speed at which change is taking place. Plan includes strategies for small business preservation, workforce development, and housing affordability.
Zimmerman et al. 2022	Review of Nationwide practice with case study focus on Atlanta, GA, Boise ID, Chicago, IL, Kansas City, KS, and the Bay Area (2021)	Review of current practices via 51 surveys of transit agencies; 5 case studies.	Finds that transit agencies are an important stakeholder in implementing and upholding anti-displacement policies and practices. Offers TriMet and BART as examples. TriMet coproduced the Southwest Corridor Affordable Housing Memorandum of Understanding which pledged a minimum of 750 affordable housing units to offset anticipated gentrification effects along new light rail alignment. In its 10-year work plan, BART has prioritized future sites of service investment based, in part, on jurisdictions with rent control and just cause eviction policies. The agency is working on an anti-displacement strategy currently.
Improvements in modelling techniques. synthesis finding: *Current modelling techniques are inaccurately predicting transportation impacts, resulting in greater financial barriers to affordability. However, options of better techniques exist.*			
Clifton et al. 2013	US nationwide, 2013	ITE prediction modelling compared to raw counts and design of recalibrated prediction model.	Authors call for changes to travel behavior modelling. Proposes that a combination of observed person and vehicle counts and intercepts surveys specific to existing TODs be used to recalibrate trip and parking generation models for future TODs.
Millard-Ball 2015	Nationwide, 2009	Comparison of household travel surveys and ITE trip generation manual outputs.	Find that ITE trip generation approach overestimates total trips by 55% and fails to account for the fact that new development does not directly generate all new trips. Rather it incites trip shifts/reshuffling from one destination to another. TODs, as a result, incur excessive impact fees stifling affordability feasibility.
Dawkins and Moeckel 2016	Washington DC and Baltimore metro areas, modelled from 2000 to 2012 and then projected from 2013 to 2040	SILO mode using 2007-08 Travel Survey datal: discrete-choice microsimulation model of individual and household	Uses a model to estimate how different policies that impose affordability restrictions on new dwellings in transit areas are associated with increased housing affordability and reducing gentrification resulting from transit. Finds that supply-side affordability requirements for new construction

Study	Geography and period	Method	Finding
		level housing selection.	have the largest impact on the sorting of low-income households near transit, while demand-side housing vouchers but they do not help low-income households move closer to transit.
Smith et al. 2021	Greater Hartford, CT	Compares Transit Opportunity Index (TOI) approach to transit access measurement to other approaches more commonly used by Housing Authorities.	More comprehensive methods, like the TOI approach, showed improvements over more commonly used transit access measures. Authors recommended that affordable housing-involved agencies not only use quantitative transit access scoring to a greater extent in their funding awarding determinations, but that they use the TOI to do so most accurately.
Ewing et al. 2017	Five case study TODs across the country; data collected in 2015	ITE prediction modelling compared to raw counts.	Find that peak parking demand TODs is less than one half the parking supply guideline in the ITE Parking Generation manual, and total vehicle trips sit at just half of what the ITE Trip Generation manual predicts. Because of this, one way to integrate affordability into TODs (planned and already existing) could be to build on parking lots and other parking-allocated space. Functionally a density bones of sorts.

State and local approaches to promote affordable and equitable TOD

Measures for affordability as it relates to transit access are less plentiful at the state-level than at the local-level; the overwhelming majority of regulatory and incentive-based interventions in support of affordable TOD are undertaken by city and county governments. In a study of 107 TODs between 1992 and 2021 across 24 different regions, only two had leveraged state-level affordable housing measures applicable to TODs, and those that existed had limited impact (Kaniewska et al. 2024). Furthermore, most state affordability-related policies are voluntary. These findings suggest a need for more housing affordability supported at the state level, mandatory regulations rather than incentive policy structures, and the creation of enforcement systems for affordability regulations.

Those state affordability measures that have had the greatest impact in terms of creating or preserving affordable units in transit-proximate areas are intertwined with other initiatives. Take, for example, the California Greenhouse Gas Reduction Fund, which raises revenues from state cap-and-trade auctions to fund the Affordable Housing and Sustainable Communities Program, which in turn prioritizes producing and preserving affordable housing near transit (Boarnet et al. 2017). Other states (e.g. Massachusetts and Colorado) have successfully leveraged widespread public support for environmental sustainability as a way to fund transit infrastructure, service, use, and transit-oriented development (Freemark and Rennert 2023).

Securing affordability near transit in the near term does not ensure long-term affordability in the absence of contract-binding policies. In the absence of regulation, Thomas and Bartolini (2017) find that such long-term affordability is better maintained during periods of political stability at the national level, in the context of transparent and amicable relationships between actors in the region (which can mean across state lines), cross-jurisdictional teams to implement TOD, and public participation in the urban design and commercial programming. Relatedly, Hersey and Spotts (2015) offer examples of success in equitable TOD funding expansion through systems of local matching of state awards, such as Denver's matching of awards from the Colorado Housing Finance Authority.

At the local and regional level, density bonuses contingent on affordability, mandatory affordable housing inclusion requirements, (transit) overlay district zoning, and context-sensitive parking regulations—e.g., the removal of parking minimums—are often recommended by scholars and have been referenced in many long-range plans. While these approaches have been found to statistically significantly increase housing affordability and reduce the displacement effects of transportation-induced gentrification (Dawkins and Moeckel 2016), they are by no means the only tools that TOD stakeholders at these levels have at their disposal.

Bodaken and Nedwick (2012) argue that housing preservation funds are going underutilized in TODs, with exceptions, such as the Green Preservation of Affordable Transit-Oriented Housing (GreenPATH) program in Washington, DC. Quigley (2010) finds that Community Development Corporations (CDCs) and tenant organizations have successfully tapped local zoning incentives and utilized pooled financing to access capital subsides and low-costs funds to preserve and increase affordability (e.g., CDCs in Seattle have mobilized the city's program that allows project sponsors to transfer development rights). HUD's Neighborhood Stabilization Program grants have supported station-area affordability. For example, Denver received $19 million in such funding specifically to preserve multi-family housing in transit corridors (Quigley 2010). Land banks also may aid in maintaining affordability. The Metro Atlanta Land Bank, for example, can hold and manage land or buildings for non-profits and government agencies for up to five years tax free. The agency can also clear delinquent taxes. This gives those working to secure financing for affordability integration into TOD more time, or the ability to avoid acting during an unfavorable swing in market conditions.

Other scholars of local-level strategies focus on what has contributed to the challenge of maintaining affordability in TODs. Some TOD projects fail due, in part, to exclusionary development practices or not planning in culturally competent ways. A case-study analysis of Los Angeles concludes that projects most effectively meet the objectives of equitable TOD in low-income communities by building on endogenous forms of cultural, political, financial, and built capital that exist in these neighborhoods (Sandoval 2016). On a similar note, Parkhurst (2012) argues that what is needed to avoid displacement is increased capacity of Community Development Financial Institutions (CDFIs) and other place-based community organizations to take advantage of new opportunities for equitable TOD—giving projects a community-up, rather than developer-down, structure.

Similarly, local and regional affordable TOD efforts may best be advanced when linked to other initiatives. Research from Kralovich (2012) concludes that pooled advocacy power and funding opportunities across policies related to health, equity, and economic development could raise the tides for each. This work further suggests that local and regional authorities could better achieve affordability in transit-rich areas if they enforced rent control or stabilization ordinances. Put succinctly, they note, that affordable housing initiatives should be combined with efforts to prevent illegal evictions and condo conversions, which may reduce the availability of housing for households with low and moderate incomes.

The role of transit agencies in co-planning for housing affordability

Some transit agencies have set higher affordability and inclusion standards for their projects than those of the municipalities they operate within. They have entered public-private partnerships to increase funds for affordable housing on their land, developed anti-displacement strategies, engaged in extensive community

engagement with residents of existing affordable housing in transit-served neighborhoods, and worked rent stabilization programs into their transit service enhancement prioritizations (Zimmerman et al. 2022). Los Angeles Metro and the San Francisco Bay Area's BART transit agency, for example, have set portfolio goals of 35 percent of total units on their properties to be affordable, with a priority towards both low income (51-80% AMI) and very low income (<50% AMI). The Massachusetts Bay Transportation Authority, in the Boston region, targets 20 percent of units at 100 percent AMI not across its entire portfolio, but for each individual project. This could help contribute to avoiding the geographic clustering of affordable housing, a development pattern that has been associated with resource hoarding outside of these clusters by wealthier neighborhoods (Imbroscio 2023).

Sound Transit in the Seattle region has set not a target but a minimum requirement of 80 percent of units per project restricted to affordability levels at or below 80 percent of AMI. Through its TOD program, the agency also prioritizes the use of land previously used for construction staging and other land holdings not actively used to run service for community-informed development. This includes affordable housing but also supports small businesses and open space (Fesler 2021).

Public-private partnerships are increasingly being operationalized by transit agencies to fight transit-induced gentrification. Sound Transit has partnered with Amazon to provide financing to build up to 1,200 new affordable housing units on agency-owned property near light rail stations; thus far, 76 percent of the 3,300 units built as a part of this effort have been affordable. The Los Angeles Metro Affordable Transit Connected Housing (MATCH) fund—a joint venture with philanthropic foundations and three national community development financial institutions—provided $75 million in loan capitalization support by 2017 for long-term affordable housing within half a mile of transit nodes.

In Austin, finally, CapMetro ran a displacement risk assessment of its planned rail and BRT networks and developed an equitable TOD plan. The result of this work was a packaged set of policies to secure new or preserved housing affordability on a station-by-station level, a service enhancement prioritization ranking by station, and station-area level strategies for small business preservation and workforce development. Though it is too early to reflect on the effectiveness of this plan, work like this has raised the bar with respect to what it means to be responsibly prepared for development interest and to plan for the protection of vulnerable communities.

Improving transportation analysis tools

Transportation impact analyses can be powerful planning tools in advancing affordability. Unfortunately, inaccurate modelling techniques can make integration and preservation of affordability a challenge. As part of the planning approval process, developers are typically required to predict the impact that a project will have on local traffic flows and parking needs. These impacts then need to be mitigated by the developers, which can take the form of actions like building additional parking, adding travel lanes, and paying impact fees to the municipality to support their expansion of transportation network capacity to accommodate these impacts. To determine transportation impacts, the most commonly used modelling technique involves the use of the Institute of Transportation Engineers (ITE) trip generation and parking generation manuals. These models have been calibrated using a nationwide sample of observed travel behaviors. When applied to walkable, bikeable, or transit-rich areas, this calibration places an overemphasis on the travel-influences factors present in car-dominant, non-urban built environments (Handy 2015; Millard-Ball 2015).

Testing the magnitude of this misalignment of model assumptions to TOD environments specifically, Millard-Ball (2015) compare household travel surveys with ITE predictions and find that modelling using the ITE trip generation approach overestimates total automobile trips associated with TODs by 55 percent. The study suggests that this is due, in part, to the fact that ITE modelling fails to account for the fact that new developments do not directly generate all new trips. Rather they incite trip shifts or reshuffling from one destination to another, often nearby. Authors of this study stress the import of this overestimation, as it results in TODs incurring excessive impact fees stifling affordability feasibility.

In their evaluation of ITE accuracy, Ewing et al. (2017) similarly find that peak parking demand among TODs is less than one half the parking supply guideline in the ITE Parking Generation manual, and that observed total TOD vehicle trips sit at just half of what the ITE Trip Generation manual predicts. Because of this, authors suggest that one way to better integrate affordability into TODs could be to build on parking lots and other space otherwise allocated for parking.

Fortunately, these modeling approaches can be altered. Scholars have proposed some improved modelling practices by testing them against the most commonly used techniques. Those seeking to operationalize best practices may want to turn to these approaches. For example, Clifton et al. (2013) suggests that ITE standards need not be done away with entirely. Rather, accuracy could be improved with more case-specific adjustments to underlying assumptions. This research team proposes that a combination of observed person and vehicle counts and intercept surveys specific to existing TODs be used to recalibrate trip and parking generation models for future TODs.

Others committed to the value that modelling could have in securing affordability in TODs but dissatisfied with widely used techniques in the current practice have focused on emphasizing calculations of access to opportunity rather than trip generation and parking need. Some affordable housing organizations use quantitative scores that include transit access measures to inform decision-making of their funding awards, for example. This is a wise choice, as accessibility via sustainable modes has a direct impact on cost of living and quality of life (Talmage and Frederick 2019). However, there remains an opportunity for improvement in this work as well. Smith et al. (2021) find that more comprehensive methods, like the Transit Opportunity Index (TOI) approach, showed improvements over more commonly used transit proximity measures in calculating household living costs and ability to cover them. Several scholars have recommended that policymakers not only use quantitative transit accessibility scoring to a greater extent in their funding award choices, but that they use the TOI to focus on keeping both mobility and housing costs down.

Appendix B

Detailed Case Studies

Austin

Demographics

Between 2010 and 2022, the Austin region was the fastest growing large metropolitan area in the country.[1] And, its remarkable growth is expected to continue. The City of Austin expects the region's population in 2050 to be 3.8 million, more than triple its 1.2 million population in 2000. The city itself is expected to grow more than 50 percent over that time, from less than 1 million to nearly 1.5 million.[2]

The demographic information below refers to the Austin-Round Rock-Georgetown, Texas metropolitan area according to the U.S. Census and American Community Survey 1-year estimates.

Table A-1. Demographic information for the city of Austin and its metropolitan area.

	Population (2023)	*Population Growth (2020 to 2023)*[3]	*Size (sq. miles)*	*Median household income (2022)*	*Travel mode to work (2022)*
Metro Area	2.5 million	Increased by 7.5%	4,219	$94,604 (compared to $67,521 in U.S.)	60% drove alone 28% worked at home 1% took transit
City of Austin	974,447	Increased by 1.5%	320	$89,415	57% drove alone 31% worked at home 2.2% took transit (compared to 3.1% for transit in the U.S.)

Issues in housing affordability

The Austin-Round Rock-Georgetown area has approximately one million housing units. Single-family units account for 64 percent and multi-family units account for 33 percent.[4]

Among the case studies, Austin ranks in the middle on the National Association of Realtors' Housing Affordability Index of single-family home affordability.

The region has fewer affordable and available rental units than most of the other case study regions, according to the National Low Income Housing Coalition. The region has 46 affordable and available units per 100 households who earn at or below 50 percent of area median income. Across the U.S., there are 56 affordable and available units per 100 households at that income level.

For more information about these indices, see "A Comparative Overview of the Case Studies" in Chapter 3.

Transit Agency: CapMetro

The Capital Metropolitan Transportation Authority, or CapMetro, is the public transit provider for Austin, Texas and its surrounding suburbs. The transit agency covers an area of 549 square miles with a population of 2.4 million. CapMetro provides bus, rail, vanpool, university shuttles, bike services, and demand response transit services. Table A-2 provides information for the transit agency.

Table A-2. CapMetro Transit Agency information

Feature	*Number*[5]
Number of Buses	416
Number of Trains	10
Bus Routes	84 (including 13 high frequency routes)
Rail Lines	1
Rail Stations	10
Annual Ridership (2023)	23.9 million)[6]

In the first half of the 20th century, Austin had an extensive streetcar network. The rise of the automobile and the construction of highways ushered in the decline of the streetcar with residential and commercial development increasingly centered around highways.

The first CapMetro rail line was approved in 2004. The Red Line (Austin's commuter rail service) began operating in 2010.

In 2014, voters rejected a referendum that would have funded a light rail line.[7] However, in 2020, they approved Project Connect and ushered in a new phase of TOD planning and thinking. The 2020 ballot language, unlike the 2014 ballot, indicated that the $7.1 billion project would include funding ($300 million) for "transit-supportive anti-displacement housing strategies."[8]

To date, anti-displacement funds have been allocated towards a wide range of programs including the following:[9]

- Loans to eligible 501c3 nonprofit organizations to preserve and develop affordable housing as well as purchase small sites for future development.
- Empowering tenants to exercise their rights through mediation, advocacy, and education.
- Assisting tenants with rent and utilities and provide economic mobility and opportunity through collaborations that provide access to early childhood, youth academic advancement, adult education, and workforce development.
- job training and occupational skills training

Project Connect has been scaled back since its plan was first approved. As of 2024, it includes Phase 1 of a new light rail line (Austin Light Rail), a new commuter rail line (Green Line), two new MetroRapid bus rapid transit lines, and improvements to the Red Line.

The Austin Transit Partnership is a local government corporation responsible for designing and constructing Project Connect. After the bus and rail components are completed, CapMetro will operate all the services. Note that the project's new lines have not been built yet.

ETOD Studies, Plans and Tools

CapMetro does not refer to TOD, but rather to ETOD (Equitable Transit Oriented Development). CapMetro's ETOD vision refers to "thriving neighborhoods with safe transit, housing for all income levels, with a strong public realm and a complete community that meets everyday needs."[10]

CapMetro has received the following five FTA grants to conduct ETOD studies, prepare plans and develop tools. CapMetro is the only agency to have been awarded FTA TOD funds in four consecutive years.[11]

- Plan for TOD and develop a sustainable multimodal transit hub at the Crestview Station ($1.5 million in 2023)
- Plan for TOD along the proposed light rail lines and the Green Line ($900,000 in 2022).[12]
- Plan for TOD at stations along the proposed light rail corridor ($750,000 in 2021).
- Plan for TOD at 13 proposed light rail stations ($900,000 in 2020).
- Support TOD planning along the Green Line ($600,000 in FY 2018

These grant funds have helped CapMetro conduct an ETOD study, develop a policy toolkit, an interactive conditions analysis tool, and a priority tool.

CapMetro's ETOD Study[13]

CapMetro led an ETOD Study in partnership with the City of Austin. The study's report, published in September 2023, provides the framework that guides ETOD. It outlines the

objectives, goals, and the engagement process with the community. This study was trailblazing for CapMetro in many ways— in the intentionality to focus on equity, prioritize underrepresented voices, align transit and housing strategies across multiple agencies, as well as the opportunity to implement policies in the advancement of major infrastructure construction.[14]

Policy Toolkit[15]

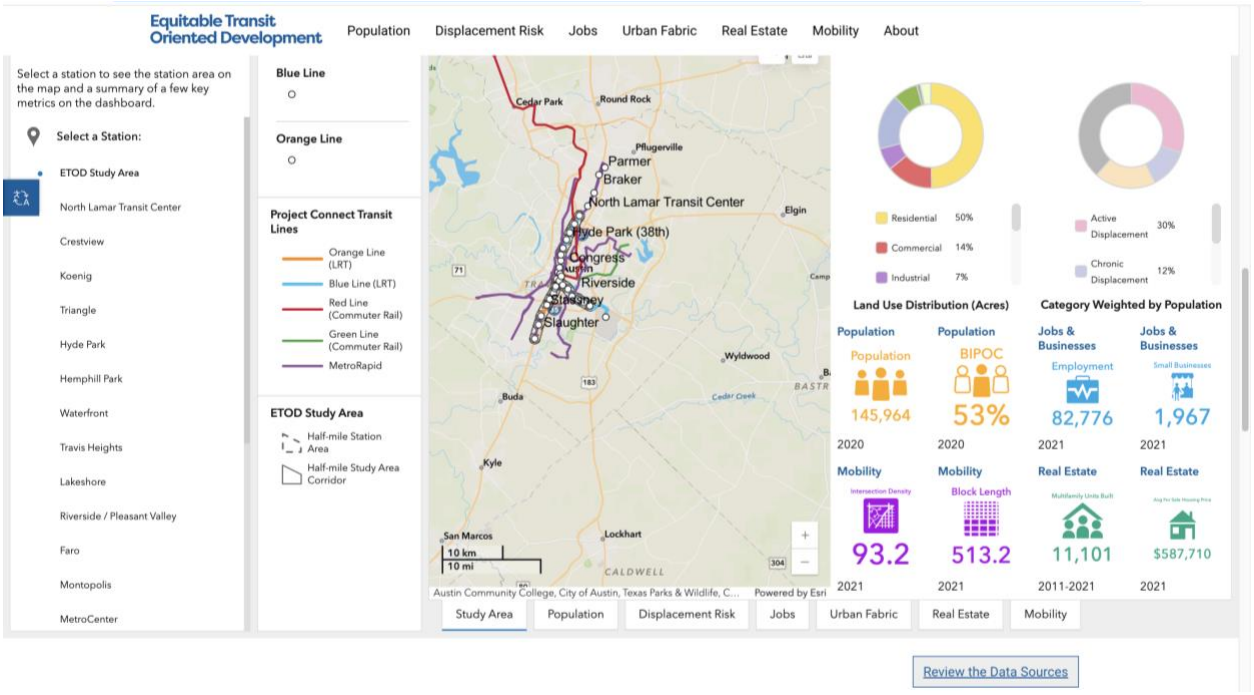
The Policy Toolkit is a comprehensive set of 46 policy measures related to workforce development, housing, mobility, land use, and real estate that CapMetro, the city of Austin, and the Austin Transit Partnership can undertake. Examples of policy measures include:

Establish minimum land use intensity of transit supportive uses
Establish high affordable housing goals for publicly owned land within ETOD area
Incentivize public amenities that improve community health and wellbeing

Interactive Conditions Analysis Tool[16]

As shown in Figure A-1, CapMetro's interactive conditions analysis uses data analysis to understand the character and trends of growth, the built environment, infrastructure, and people.

Figure A-1. CapMetro Interactive Conditions Analysis Tool



Source: CapMetro

Priority Tool[17]

CapMetro's Priority Tool is a web-based application that maps out ETOD areas and allows users to identify the appropriate ETOD policies that apply to those areas. The term "prioritizing" refers

to the goal of minimizing displacement risk and supporting opportunities to achieve equitable outcomes. The tool provides information to a wide range of users. For example, it can:

- help policymakers quickly understand relevant policy tools that are applicable within each planned station
- help community members understand how the neighborhoods near future stations are performing on achieving ETOD goals.
- help developers understand where land uses and incentives are aligned with producing community benefits such as affordable housing.

Barriers to TOD and Affordable Housing

CapMetro officials noted the following barriers to TOD and affordable housing:

- Developers may decide to build market rate housing instead of affordable housing because of market conditions and/or the lack of zoning entitlements that would incentivize them.
- Projects with affordable housing can fail, if too much is expected of them such as expensive public amenities, and an overly optimistic number of affordable units and deeper levels of affordability.
- The term affordable housing is often misunderstood. Communities do not always comprehend that affordable housing is often embedded in mixed-income housing developments, and the design and construction of these multifamily buildings are indistinguishable from market rate housing. Some people equate affordable housing with large inner-city public housing projects that were built in the 1950s and 1960s.
- The state of Texas prohibits mandatory inclusionary zoning for homeownership units. For example, municipalities cannot require a certain percentage of homes in a new development to be sold below a certain sales price to low-income families. However, this prohibition does not extend to rental housing; municipalities can set a maximum rental price for low-income households.[18]
- Pushback from communities can be expected when projects completely change the characteristics of an existing neighborhood, especially if a mixed-use development will push out existing owners, renters, and small businesses.
- Rising land values and construction costs during the pandemic have decreased the purchasing power of the $300 million set aside for transit-supportive anti-displacement housing strategies.
- Many affordable housing solutions are time limited. For example, a private building owner who receives a low-income housing tax credit may be able to rent units at market rates after 30 years.

Land Use

The city of Austin has been making numerous zoning changes to increase the production of affordable homes.

In December 2023, the city approved a zoning change that would allow up to three housing units to be built on a single-family zoned lot. This was part of the "Home Options for Middle-Income Empowerment" (HOME) initiative.[19]

In May 2024, the city approved a measure that would decrease the minimum single family lot size for the first time in 80 years. Property owners can now build a single-family home on as little as 1,800 square feet of land, compared to the previous minimum of 5,750. The new law allows apartment buildings to be built closer to single-family homes and denser development near the new CapMetro stations. This was part of the "HOME Phase 2" ordinance.[20]

In May 2024, as part of an "Equitable TOD Overlay," the council established requirements for developments to provide income-restricted affordable housing or a fee-in-lieu, with different tiers of affordability requirements based on building height.[21]

Retail[22]

The ETOD study recommends that where active ground floor uses are required, the currently allowable uses be expanded to allow for a wider variety of services and amenities such as health care, childcare, libraries, co-working space, and community space. CapMetro has also proposed smaller storefronts to accommodate small businesses.

The ETOD study's recommendations for commercial retail space include limiting ground floor parking within a certain distance to the street, maximizing the facade transparency, and requiring at-grade entrances.

Parking

In November 2023, the city of Austin eliminated minimum off-street parking requirements for residential and commercial developments.[23] At the time, city officials noted that parking was adding to the cost of construction (surface parking spaces cost $5,000 to $10,000 per space to construct, while structured parking spaces cost up $60,000 per space.)

The city also noted that "the provision of vehicle parking spaces is strongly linked to mode choice" and "minimum parking requirements have resulted in an overabundance of parking in many locations throughout Austin and have continued to encourage people to drive to their destination. These parking spaces are expensive to build and maintain, and promote automobile use even when short trips can be easily accessed by walking, bicycling, or by taking transit."[24]

The ETOD Study recommends the following measures that have not yet been implemented:

Establish parking maximums. This measure would create a set limit on how many parking spaces a development can have.

Counting parking as part of the floor-area-ratio to encourage developers to reduce parking space and increase building space.

Examples of TOD and Affordable Housing

Plaza Saltillo Station[25]

In 2013, CapMetro adopted a TOD policy that would guide the development of TODs, and it issued an RFP for a site it owned near its Plaza Saltillo station. This ten-acre site had served as a rail yard for decades until was abandoned in the 1980s.

CapMetro's board selected the winning developer's proposal based on evaluation criteria that included:

- Potential to increase transit ridership
- The strength of the developer's capabilities.
- Developer's track record of addressing communities' needs for housing, employment, retail, office and other services in their projects.
- Preliminary proposed land uses and how they conformed with CapMetro's objectives
- Financial structure and return to CapMetro.

This was CapMetro's first TOD through a development agreement and Austin's introduction to mixed-use density next to transit, shown in Figure A-2. The project completed in 2020 includes 800 apartments, almost 20 percent of which are designated for households who earn, on average, 50 percent of Austin's AMI. The site also includes retail space and office space. CapMetro is leasing the land to the developer (Endeavor Real Estate Group) and will remain the owner.

Figure A-2. Plaza Saltillo Station

Source: Endeavor Real Estate Group[26]

Key Lessons

- Austin has been able to conduct ETOD planning before any major construction associated with its major expansion program. The agency and its partners have taken the time to create a wealth of comprehensive information on ETOD, such as the policy plan, policy

toolkit, priority tools, interactive conditions analysis tool, and its own case studies of other agencies.

Working together, CapMetro and the City of Austin have successfully combined transit and land use planning. CapMetro's work directly led to zoning changes that will lead to more mixed use developments and more affordable housing.

Who We Talked to

Sharmila Mukherjee, Executive Vice President of CapMetro
Anna Lan, TOD Manager with CapMetro

Useful resources and innovative tools

Table A-3. CapMetro Useful resources and innovative tools

Resources	*Content*	*URL*
ETOD Study: Final Report	The main policy plan for CapMetro's ETOD strategy.	https://www.projectconnect.com/docs/librariesprovider2/etod/20230928-etod-final-report-(combined).pdf
Lessons Learned from Other Cities	CapMetro prepared a report that identifies lessons learned from other cities regarding ETOD strategies, equity tools, and equitable engagement.	https://www.projectconnect.com/docs/librariesprovider2/default-document-library/etod-case-study-layout.pdf
ETOD Priority Tool	Website that maps out ETOD areas and allows users to identify the appropriate ETOD policies.	https://experience.arcgis.com/experience/0388c5d05c0b45d495d2c2c74500f60a/
Interactive Conditions Analysis Tool	Uses data analysis to understand the character and trends of growth, the built environment, infrastructure, and people.	https://capmetro-etod-nelsonnygaard.hub.arcgis.com
Anti-Displacement Dashboard	Spending of the $300 million anti-displacement funds approved by voters in 2020.	https://www.austintexas.gov/page/anti-displacement-funding

Austin Endnotes

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https://www.austintexas.gov/news/new-census-data-austin-metro-slips-top-spot-remains-one-nations-fastest-growing-regions.

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[3] U.S. Census Bureau, "Metropolitan and Micropolitan Statistical Area Population Totals: 2020-2023," https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html; U.S. Census Bureau," City and Town Population Totals: 2020-2023," https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-cities-and-towns.html.

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[5] CapMetro, "Facts," https://www.capmetro.org/facts; CapMetro, "Performance Dashboard," https://www.capmetro.org/about/performance-dashboard.

[6] American Public Transportation Association, "2023 Q4 Ridership Report," https://www.apta.com/wp-content/uploads/2023-Q4-Ridership-APTA-Update-1.pdf.

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[8] City of Austin, "2020 Proposition A: Project Connect," https://www.austintexas.gov/2020PropA.

[9] City of Austin, "Anti-Displacement Funding," https://www.austintexas.gov/page/anti-displacement-funding.

[10] CapMetro, "Equitable Transit-Oriented Development Study," September 2023, https://www.projectconnect.com/docs/librariesprovider2/etod/20230928-etod-final-report-(combined).pdf.

[11] FTA's awards for its TOD Planning Projects at:

- www.transit.dot.gov/funding/grants/grant-programs/fiscal-year-2023-transit-oriented-development-tod-planning-projects
- www.transit.dot.gov/funding/grants/grant-programs/fiscal-year-2022-transit-oriented-development-tod-planning-projects
- www.transit.dot.gov/funding/grants/grant-programs/fiscal-year-2021-transit-oriented-development-tod-planning-projects
- www.transit.dot.gov/grants/grant-programs/fiscal-year-2020-transit-oriented-development-tod-planning-projects

- www.transit.dot.gov/funding/grants/grant-programs/fiscal-year-2018-transit-oriented-development-tod-planning-projects

[13] CapMetro, “ETOD Study: Final Report.”

[14] Project Connect, "Equitable Transit-Oriented Development (eTOD)," https://www.projectconnect.com/projects/etod.

[15] Project Connect, "Appendix A: Policy Toolkit," https://www.capmetro.org/docs/librariesprovider2/etod/appendix-a-policytoolkit.pdf?sfvrsn=2011e254_1.

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[18] Way, Heather, "The Myth about the Inclusionary Zoning Ban in Texas," *Texas Housers*. May 15, 2015.

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Bay Area (San Francisco)

Demographics

The San Francisco metropolitan area, commonly known as the Bay Area, is the second largest metropolitan area in California, by population. The population has grown over the past 60 years and the region grew 6 percent between 2010 and 2020. However, as shown in Table B-1, the population declined by 3.8 percent between 2020 and 2023, the first time the region's population has decreased in decades (Metropolitan Transportation Commission, 2024).[1]

Table B-1. Demographic Information for the Bay Area

	Population (2022)	*Population Change (2020 to 2023)*	*Size (sq miles)*	*Median household income (2022)*	*Travel mode to work (2022)*
San Francisco-Oakland-Berkeley metro area[2]	4.6 million	Decrease by 3.7% (U.S. Census Bureau)[3]	2,470.3	$128,151 (compared to $74,580 in the U.S.)	50% drove alone 27% worked at home 4% walked 8% public transit (compared to 3.1% for transit in the U.S.)
City of San Francisco[4]	808,437	Decrease by 7.1%[5]	46.7	$136,692	29% drove alone 33% worked at home 9% walked 17% public transit.

Issues in Housing Affordability

Rents and housing prices in the Bay Area are some of the highest in the country.

Compared to all the other case study areas, the typical family in the Bay Area is the least likely to earn enough income to qualify for a mortgage on a typical home, according to the National Association of Realtors' Housing Affordability Index.

According to the National Low Income Housing Coalition, 48 rental units are affordable and available for every 100 renter households at or below 50 percent of the area median income in the San Francisco-Oakland-Berkeley region.

For more information about these indices, see the Introduction to the Case Studies.

Transit Agency: BART

The Bay Area has a long history of providing public transit for the region, dating back to the late 19th century with the dawn of the cable car. The growth of the public transit system in the early 20th century helped the region grow in population and economic development. The Bay Area has 27 different transit agencies -- this case study focuses on the San Francisco Bay Area Rapid Transit District (BART).

BART provides heavy rail service in five counties (San Francisco, San Mateo, Alameda, Contra Costa, and Santa Clara). Its first line opened in 1972. Table B-2 provides BART agency information.

Table B-2. BART Agency information

Feature	*Number*
Number of Buses	None
Number of trains	669 vehicles
Bus Routes	None
Rail Lines	6
2023 Annual Ridership (APTA, 2024)[6]	47.7 million
Stations	50 rail stations

TOD at BART

The BART system was primarily designed so that suburban residents could park their cars at stations, and then take a train to major employment centers (such as those in Oakland, San Francisco, and Berkeley.) BART currently owns and operates more than 47,000 parking spaces at 36 stations (BART, n.d.).[7]

Land use at BART stations began to change in the 1990s with the establishment of the agency's TOD program, which was created to attract more riders and promote economic development. As time went on, policy makers recognized other impacts of TOD including reducing congestion and greenhouse gas emissions, lowering household transportation costs, and connecting low-income communities to jobs, housing, and transit (BART, 2024).[8]

BART works with local jurisdictions to advance development at its stations. The transit agency can leverage its real estate to achieve regional and economic development goals. BART has approximately 250 acres around 27 of its train stations with development potential.

In 2016, the BART Board adopted ambitious TOD goals including completing 20,000 residential units and 4.5 million square feet of commercial space on BART property by 2040. The agency's goal is for 35 percent of the units across the TOD portfolio to be affordable.

Since 1993, 20 TOD projects have been completed with 4,232 residential units (of which 1,298 are affordable) and 875,000 square feet of commercial space. The agency currently has eight projects in the planning or pre-development stages (BART, 2024).[9]

Although most of the agency's TOD focus relates to land that it owns, it also has a station area planning team that works with municipalities to influence local zoning so that local zoning ordinances are transit supportive.

Among some policy makers, the perception of BART has changed. Not only does the transit agency provide train service, but it is also seen as encouraging the development of new housing and helping to solve the region's housing crisis.

BART's TOD Policy and Guidelines

BART's TOD policy acts as the foundation for the agency's development work. The policy's six goals include increasing ridership, encouraging non-auto transportation choices, and linking housing affordability with access to opportunity (BART, 2020).[10]

Strategies identified in the policy include:

- Favoring ground leases of no more than 66 years (rather than outright sale of land) except in cases where alternative approaches are required to achieve specific development objectives or where other strategies would generate greater financial return to BART
- Supporting local jurisdictions in developing plans and policies that include TOD elements
- Soliciting proposals for TOD in localities that have an adopted plan allowing for transit supportive land uses, and ensuring the solicitation process considers property owned by adjacent landowners
- Plan TOD opportunities as part of BART system expansion planning
- Provide up to a 60 percent discount in ground leases for projects with at least 35% affordable housing

The TOD policy incorporates BART's affordable housing policy (BART, 2016)[11] which states that at least 20 percent of the housing units at a BART TOD should be affordable. The policy does not identify a certain income that is considered affordable, although it does state that there shall be a "priority on residential units made available to very low (less than 50 percent AMI) and low (51 to 80 percent AMI) income households." The affordable housing policy further calls for 35 percent of all residential units across BART's TOD portfolio to be affordable.

BART issued a TOD Guidelines document in 2017 to provide greater clarity about the agency's expectations both on its property and within the larger station area (BART, 2017).[12] The purpose of the guidelines includes the following:

Disseminate information about BART's TOD program to developers, local governments, and staff.

Lay out a road map for defining, evaluating, selecting, and constructing TOD projects.

Identify roles and responsibilities of BART staff, local governments, and developers.

Offer guidance in developing station area plans.

BART's undertakes a six -step process for developing its sites:

- Working with jurisdictions and communities to set site goals and objectives, and understand the real estate market
- Running a competitive process to select a site developer
- Working with the developer on a community engagement plan, design parameters, and review of early development concepts; supporting the developer in securing entitlements and grants, and negotiating deal terms and executing agreements conferring development rights to the property
- Preconstruction including design review, permitting and negotiations
- Construction
- Occupancy / post-construction (BART, 2024)[13]

TOD Roles

TOD is implemented through the combined efforts of the BART's board, its staff, local jurisdictions, developers, and the community (BART, 2017).[14]

BART's Board sets TOD policy, approves TOD project agreements, and approves preliminary developer selections. The agency's general manager and staff manage its TOD activities.

BART generally solicits proposals for TOD projects in jurisdictions that have adopted transit-supportive land use plans and are consistent with BART TOD guidelines. Jurisdictions can influence the amount of affordable housing provided at a site beyond BART's minimum of 20 percent by contributing funding towards affordable housing. For example, the City of Berkeley is dedicating Housing Trust Fund dollars towards exceeding the 20 percent affordability minimum at BART's TODs at North Berkeley and Ashby stations. The Trust Fund pools together funding from federal sources, fees on commercial development and market rate housing, as well as other state sources (City of Berkeley, 2022).[15]

BART and their developers also work with other partners including counties, regional agencies, housing authorities, and state agencies – who provide funding and support infrastructure development for TOD projects.

TOD Benefits to Ridership

BART has reported that development within a half mile of its stations is crucial for increasing ridership because the frequency of residents, employees, and visitors using transit for a variety of trip purposes increases as the distance to that station decreases. One pre-pandemic study of Bay Area transportation and land use found that TOD residents commute by transit five times more than the average worker in the same city and TOD office workers commute by transit 3.5 times more than workers in the surrounding region. Another study found that TOD residents living within 0.25 miles of a BART station use transit for work trips twice as often as those living one to two miles away from BART (BART 2024).[16]

Prioritizing Sites

Many cities and counties have identified BART-owned or operated land as potential TOD sites. However, due to capacity and funding constraints, only a limited number of projects can be advanced for development each year.

To prioritize sites, BART considers four categories and weighs each of them, as shown in Table B-3, below (BART, 2024)[17]:

Table B-3. BART TOD site prioritization criteria

Category	*Sample Criteria*	*Weight*
Market readiness	Strength of office and multifamily residential markets	26%
Local support for TOD	willingness to provide funds and adoption of appropriate zoning	19.5%
Infrastructure readiness	impact of TOD on BART riders' parking	19.5%
Development capacity	developable acreage and density	35%

Parking and Land Use[18]

For BART station areas, BART encourages local governments to adopt transit supportive land use regulations that enable a minimum net density of 75 units per acre and have no minimum parking requirements. BART has adopted a target that by 2025, the average parking at developments will not exceed 0.9 spaces per residential unit, and 1.6 spaces per 1,000 square feet of commercial space (BART, 2017).

BART uses a parking replacement model to quantify the ridership and revenue impacts of different TOD scenarios. The agency notes that building TOD on BART property will bring in new riders, but the increase may be offset if the number of parking spaces is reduced, and some drivers stop taking BART. The basic analysis approach is documented in "Replacement Parking for Joint Development. An Access Policy Methodology" (Wilson, 2005).[19] BART is working to update this model to reflect current conditions.

Note that BART's revenue from parking is relatively modest since the agency only charges $3 per day to park at most of its stations. In Fiscal Year 2024, passenger fares are expected to generate $285 million while parking will only bring in $14 million (BART, 2022).[20]

State legislation regarding TOD and affordable housing

Housing Elements Law

The State of California requires all cities and counties to adopt a housing element as part of a general plan to identify how they and where they will accommodate projected housing needs. The housing element process identifies housing needs across income levels, and identifies local strategies to respond to those needs. State funding programs for transportation, infrastructure, and housing often require or consider a local jurisdiction's compliance with this requirement (California Department of Housing and Community Development, n.d.; City of Sonoma, n.d.).[21]

BART staff indicated that recent strengthening of Housing Element compliance has resulted in some jurisdictions to consider developing areas around BART stations more favorably than in the past.

Baseline Zoning Standards[22]

In 2018, California's state legislature passed Assembly Bill 2923 requiring BART to establish zoning standards that conform with TOD on BART owned land near stations in San Francisco, Alameda, and Contra Costa counties. These standards include building heights, residential densities, floor to area ratios, and parking ratios. Local jurisdictions are required to adopt a local zoning ordinance that conforms to the zoning standards within two years of BART developing them (BART, 2019).[23] Note that this law currently sunsets on January 1, 2029.

Barriers to TOD and Affordable Housing

The following barriers listed below were identified by BART or the City of Berkeley.

Market conditions

- High interest rates, high construction costs, and stagnating rents are creating unfavorable conditions for development and land transactions associated with the construction of both market rate and affordable housing.

Along with housing, office buildings can be a key element of TOD projects. But demand for new office construction in the Bay Area has declined substantially since 2019 due to changing travel patterns and the greater prevalence of work from home.

Developers are not generating as much revenue from market rate housing as could be used to support affordable housing. Average residential rents in the third quarter of 2023 were $3,050 in San Francisco. These rents are well-above the national average of $1,670 for the same time period, but lower than 2019 rents.

Balancing priorities

It can be challenging for a transit agency to balance priorities including: providing sufficient parking for customers, generating maximum revenue from leasing land, offering land at discounts for affordable housing, and ensuring that the development and construction do not affect its maintenance and operational needs.

NIMBY

In some communities, not-in-my-backyard (NIMBY) voices in the planning process can delay or stop projects.

Examples of TOD and Affordable Housing

TOD at South Hayward station

In the City of Hayward (located in Alameda County, east of San Francisco), a public-private partnership redeveloped a BART overflow parking lot (as well as other public and privately owned land) into a mixed-income community with a new public park.[24]

As part of BART's planning process, it conducted a parking replacement study in 2011, comparing four development and parking replacement alternatives. BART estimated future revenue from fares, parking, and a ground lease. As shown in Figure B-1, BART determined that Scenario A was optimal from a financial standpoint (BART, 2017).[25]

Figure B-1. BART Parking Replacement Model for South Hayward TOD

South Hayward	No Project	Scenario A	Scenario B	Scenario C
Housing Units	0	788	681	886
Commercial Square Feet	0	60,000	60,000	60,000
On-Site BART Parking	1,252	910	1,083	0
Satellite Parking	0	0	0	910
Replacement BART Parking	100%	73%	87%	73%

South Hayward	No Project	Scenario A	Scenario B	Scenario C
Change in Fare Revenue	$0	$639,000	$719,000	$373,000
Parking Revenue	$372,541	$279,400	$326,500	$0
Revenue at 10% Land Rent	$0	$1,363,240	$1,178,130	$1,532,780
Revenue at 5% Land Rent	$0	$681,620	$589,065	$766,390
O&M Costs	($723,944)	($720,500)	($820,500)	($1,629,027)
BART Annual Fiscal Impact (land rent 10% of property value)	($351,000)	$1,561,000	$1,403,000	$277,000
BART Annual Fiscal Impact |(land rent 5% of property value)	($351,000)	$888,000	$814,000	$490,000

Credit: BART

A non-profit organization subsequently built 151 affordable units for families and seniors near the BART station. The $52.5 million project, completed in 2016, required nine different sources of funding (Kimura, 2017).[26] In addition, a for-profit developer built 206 market-rate units.[27]

Figure B-2. South Hayward TOD Development (copyright permission pending)

Source of Photo: BART.

TOD at Ashby Station

In 2015, BART, in collaboration with the City of Berkeley (also located in Alameda County) began planning to improve a corridor that includes the Ashby BART station and two BART parking lots: a 4.3-acre site (West Lot) and a 1.7-acre site (East Lot), shown in Figure B-3.

Figure B-3. Ashby Station TOD site aerial view

TOD area around Ashby station. Source: BART.

In the final stages of the plan's development, the California state legislature passed Assembly Bill 2923 which required BART to establish TOD zoning standards for the two parking lots. Subsequently, Berkeley and BART created a joint vision for TOD, and the Berkely City Council reserved approximately $53 million of city-controlled funds to support affordable housing at TODs at the North Berkeley and Ashby Stations (BART, 2021; City of Berkeley, n.d.).[28]

Key Lessons

Early Planning: Transit agencies need to understand the impacts to the infrastructure associated with TOD projects and make sure potential developers understand barriers they will face. For example, if a parking area has an electric substation or a bus facility, the project plan needs to be clear in how the development will be built around existing infrastructure and whether utilities and facilities need to be moved.

Institutional Support: It is important to get multi-disciplinary support within transit agencies and municipalities to support projects. That includes departments within cities (e.g., engineering, emergency services) and the transit agencies (operations, planning, maintenance). When they are not aligned, projects are more difficult to move along.

Community Engagement: Transit agencies need to understand local issues that could be controversial (e.g., whether a community will support on-street parking).

Region Increasingly Supportive of Affordable Housing: Because of the region's housing crisis, the general public and elected officials have become more supportive of affordable housing programs. That can be seen in AB 2923, local housing elements, more funding programs, and more organized community voices that have led to a YIMBY (Yes In My Back Yard) movement.

Affordable Projects Moving Faster: Phases of BART's TOD projects that focus on affordable housing are progressing in advance of market rate phases. That is because rising construction costs, relatively high interest rates, and sluggish rents are making it difficult for market rate developers to move forward, while the availability of affordable housing funding that developers can tap into enables them to advance.

Financing: Bond measures and housing trust funds have helped fund affordable housing projects. For example, Alameda County voters in 2016 overwhelming approved a referendum for the county to issue up to $580 million in bonds to support the creation of an expected 3,800 affordable homes.[29] Also, 30 California cities (including San Francisco, Berkeley, and Oakland) have established housing trust funds that can pay for the preservation and rehabilitation of existing housing, land acquisition, new construction, and rental subsidies (County of Alameda, CA, n.d.) [30]

Retail: At some of its sites, ground floor retail has been required, but retail vacancy rates have been high. To avoid that problem, BART has been considering other ground floor uses (such as after school programs) and requiring less ground floor retail.

Political leadership: Having the support of local political leadership with TOD policies and projects is critical. The transit agency should make sure that political leaders (mayors, city council members, and even state legislators) are aware of projects, their impacts, and funding sources.

Ridership Benefits Of TOD: Studies of Bay Area transportation and land use found that TOD residents are much more likely to use BART than residents who live further away from stations.

Legacy vs. New Lines: BART now considers TOD opportunities when it plans future rail extensions. Since its existing rail network was built without considering TOD, the land use must respond to the existing rail network and not vice versa.

Ground Leases: BART favors long-term ground leases of no more than 66 years, rather than the sale of property, as the standard disposition strategy for joint development projects, except in cases where alternative approaches are required to achieve specific development objectives.

Soliciting Proposals: BART prioritizes soliciting development proposals for TOD in localities that have an adopted plan and zoning allowing for transit supportive land uses, where infrastructure barriers are minimal, where data indicates market readiness, and where sites can generate significant development.

Discounts for Affordable Housing: BART may discount land by up to 60 percent, depending on the depth and amount of affordable housing provided.

Guidelines: BART's TOD Guidelines provide clarity to local governments and developers about its expectations. both on its property and within the larger station area.

Prioritizing Sites: BART is transparent in the way that it prioritizes sites by considering market readiness, local support for TOD, infrastructure readiness, and development capacity.

Evaluating Alternatives: BART uses a parking replacement model to quantify the ridership and revenue impacts of different TOD scenarios.

Who We Interviewed

Carli Paine—TOD Group Manager, Bay Area Rapid Transit
Tim Chan—Group Manager, Station Area Planning, Bay Area Rapid Transit
Jordan Klein—Director, Department of Planning & Development, City of Berkeley

Useful resources and innovative tools

The following resources are all found on BART's website, shown in table B-4.

Table B-4. BART Useful resources and innovative tools

Resource	*Contents*	*URL*

TOD Policy	BART's vision, goals, and strategies.	https://www.bart.gov/sites/default/files/docs/BART%20Transit-Oriented%20Development%20Policy_Amended2020-04-23.pdf
TOD Guidelines	Information about Bart's TOD program for developers and local governments.	https://www.bart.gov/sites/default/files/docs/BART_TODGuidelinesFinal2017_compressed_0.pdf
Replacement Parking for Joint Development. An Access Policy Methodology	Suggested method for replacement parking strategies.	https://www.bart.gov/sites/default/files/docs/2005%20Access%20Policy%20Methodology.pdf
TOD Program Work Plan	BART's TOD accomplishments, priorities and prioritization process.	https://www.bart.gov/sites/default/files/2024-08/20240826%20TOD%20Work%20Plan_Final.pdf
TOD home page	Information about project and policies.	https://www.bart.gov/about/business/tod
Affordable Housing Policy	Identifies goals for housing based on income levels.	https://www.bart.gov/sites/default/files/docs/Affordable%20Housing%20Policy%20Adopted%201-28-16_0.pdf
Framework for Determining Financial Return from Affordable Housing	BART's intentions toward its own financial return expectations for affordable housing.	https://www.bart.gov/sites/default/files/docs/BART%20Financial%20Return%20Framework_2021-03-21v1.pdf

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Chicago

Demographics

Between 1950 and 2010, the City of Chicago's population plummeted from 3.6 million to 2.7 million. Although its population increased by approximately 50,000 over the next decade, the city again lost population during the pandemic. As shown below, both the city and the region have been losing population in recent years.

U.S. Census data is shown in Table C-1.

Table C-1. Demographic Information for the city of Chicago and its metropolitan area

	Population	*Population Change (2020 to 2023)*	*Size (sq. miles)*	*Median household income (2022)*	*Travel mode to work (2022)*
City of Chicago[1]	2.7 million (2023)	Decrease of 2.9%	234 sq. miles	$70,386	65.4% drove alone 7.6% carpooled 13.1% worked at home 2.6% walked 9% transit
Metro Area (Chicago-Naperville-Schaumburg)[2]	9.3 million (2023)	Decrease of 1.8% (compared to 1% increase in U.S.)	10,286 sq. miles (Metra's service area is 3,700 sq. miles)	$82,914 (compared to $74,580 in U.S.)	63% drove alone 8% carpooled 17% workday at home 3% walked 7% transit (compared to 3.1% for transit in the U.S.)

Issues in Housing affordability

Affordable housing is an issue experienced across the country, regardless of whether population is increasing or decreasing.

Households are considered cost burdened when they spend more than 30 percent of their income on rent, mortgage and other housing needs. In Chicago, 22.6 percent of households pay over half

their income for housing compared to 15.9 percent across the U.S. (Cromwell, 2022; Mishra, 2024; Joint Center for Housing Studies at Harvard, 2023) [3]

Compared to the other case studies, the typical family in the Chicago region is more likely to earn enough income to qualify for a mortgage on a typical home, per the National Association of Realtors' Housing Affordability Index.

In the Chicago-Naperville-Elgin (IL-IN-WI) metropolitan area, 58 rental units are affordable and available for every 100 renter households with incomes at or below 50% of area median income, according to the National Low Income Housing Coalition. This is slightly more than the average of 56 across all major U.S metropolitan areas.

The Introduction to the Case Studies shows all the case study indices.

Transit Agencies

The Chicago area has three large transit agencies. The Chicago Transit Authority (CTA) provides rail and bus services within the city and nearby suburbs. Metra, a commuter railroad, serves northeastern Illinois and its routes total nearly 500 miles. A third agency, Pace Suburban Bus, provides bus service in the city's suburbs and paratransit service for the entire region.

The Regional Transportation Authority (RTA) coordinates the Chicago region's transit system, oversees its financing, and conducts regional planning for the six counties of Northeastern Illinois. Table C-2 provides general transit information for CTA and Metra.

Table C-2. Transit information for CTA and Metra

Feature	*CTA (CTA, n.d.)[4]*	*Metra (Metra, n.d.)[5]*
Number of buses	1,868	N/A
Number of trains / light rail vehicles	1,480 rail cars	163 locomotives 1,041 coaches and cars
Bus routes	127	N/A
Rail lines	8	11
2023 Annual Ridership (APTA, 2024)[6]	279.1 million	31.9 million
Number of Rail Stations	145	242

Evolution of RTA's TOD Program[7]

The RTA Community Planning program provides funding and technical assistance to local governments to help foster the growth of "sustainable, equitable, walkable, and transit-friendly

communities." Since 1998, the RTA has allocated funds through its *annual* Community Planning program to more than 200 transit-related projects around the region. Funding comes from RTA, federal, and local funding sources and most of the project work is performed by consultants (RTA, 2024).

Examples of eligible projects include creating ETOD plans and conducting transit corridor studies. The program also supports implementation initiatives, including organizing and hosting developer discussions and writing zoning code updates.

The Chicago metropolitan area consists of more than 250 municipalities that have a wide range of resources and technical capabilities. The municipalities have land use control, including zoning, to regulate the use and development of properties within their boundaries.

RTA-funded Community Planning Projects located in the City of Chicago are led by the city's planning and transportation departments, and by CTA. In smaller communities with limited staff, an RTA project manager often works directly with the mayor or the town's administrator and provides ongoing assistance, including help with procuring and managing consultants.

If the RTA provides funding for a municipalities' study (e.g., to prepare an ETOD plan), the RTA board does not formally approve any municipal plans, but RTA staff does review and provide comments on the plans to ensure they are supportive of transit, realistic and support ETOD goals. Moreover, the RTA does ask municipalities to bring report recommendations and plans to their village boards or city planning commissions for approvals.

Originally, the Community Planning program focused on creating densely populated walkable communities with a mix of uses. There was little emphasis on affordable housing. In recent years, RTA has placed a greater emphasis on affordable housing. The program now prioritizes funding to communities with high needs and economically disconnected and disinvested areas. Many of Chicago's neighborhoods as well as its suburbs meet these criteria.

RTA now uses the term Equitable TOD (ETOD) rather than just TOD because planners and the general public have become increasingly aware that that the region is in an affordable or "attainable" housing crisis. Several trends have converged: housing has become more expensive, many buildings with two to four residential units have been replaced with single family homes, and equity has become a more prominent policy issue (Institute for Housing Studies at DePaul University, 2021).[8] Moreover, the region is not building much new housing; in 2023, the Chicago region ranked 45th out of the 50 largest metropolitan areas in new apartment construction on a per-capita basis (Rafter, 2024).[9]

In early 2024, RTA selected eight projects from among 21 applications. The applications were vetted by a project selection team that included staff from the RTA, CTA, Metra, Pace, and the region's MPO. The total cost for all eight projects was $877,000, comprised of approximately 90 percent in RTA funds and 10 percent in local match from the applicants. This amount is relatively modest because funding for the program predominantly pays for consultants to conduct studies and issue reports.

CTA and Metra have both been extensively involved in the studies funded by RTA and the MPO, and additional efforts and strategies have often grown out of that involvement.

The City's ETOD Policy

Although CTA is an independent agency, its policies are typically aligned with the City of Chicago. The city takes the lead in ETOD planning, and CTA works closely with city agencies and is a member of the city's ETOD Working Group.

Since 2013, the City of Chicago has been encouraging TOD development near its CTA and Metra rail stations, and later included high-frequency bus routes. In 2021, the Chicago Plan Commission unanimously adopted an ETOD policy plan which established equity as a guiding framework for TOD initiatives moving forward. The City's ETOD goals include driving investment near transit in disinvested communities, preventing displacement in communities facing rising housing costs, and promoting affordable housing options near transit in low-affordability communities – all while creating more walkable, people-centered neighborhoods (City of Chicago, n.d.).[10]

In 2022, the City passed the Connected Communities Ordinance which implemented many recommendations from the 2021 ETOD Policy Plan. Key provisions include (City of Chicago, 2022):[11]

- Extending ETOD incentives to a 4-block radius from rail stations and 2-blocks from additional strategic bus corridors.
- Implementing pedestrian-safety standards on new construction near rail stations
- Strengthening incentives for the provision of on-site affordable units in ETOD projects

<u>City of Chicago's Zoning and Parking</u>[12]

To ensure that developments take advantage of their proximity to transit, the City of Chicago's zoning code allows more dwelling units in ETOD areas than outside them. It works by changing some variables in the formulas that control building size and maximum number of dwelling units (City of Chicago, 2023; Elevated Chicago, 2023).

The city of Chicago requires residential developments with 10 or more units (that receive City Council approval for an entitlement, a city land purchase or financial assistance) to provide a

portion of the units as affordable housing.[13] The highest zoning bonus is now only available if a developer or property owner plans to build *on-site* all of the required affordable housing units.

A key part of Chicago's ETOD policy is flexibility on requirements for off-street parking near CTA and Metra stations. Parking mandates are completely eliminated for projects located within a TOD area, if half or more of the dwelling units are assisted or affordable housing.

Right Sizing Parking

Historically, Metra has been actively involved in the development of TOD plans funded by the RTA and the region's MPO. This has led to a multitude of successful developments around the Chicago region that include a mix of uses to support walking, biking and transit use. However, Metra has not actively led many redevelopment efforts, often looking to communities to initiate discussions about potential development. In 2024, Metra's planners are looking beyond participating in TOD studies and have begun to take a more proactive approach -- reaching out to local officials and offering them suggestions about potential development opportunities. The agency's approach has evolved in keeping with their evolution toward a regional rail service model and because ridership patterns have changed drastically in the wake of the shift to remote work brought on by the COVID pandemic.

Metra is not looking at TOD to sell property and generate revenue, in part because the vast majority of its parking facilities are owned by communities and freight railroad companies. However, the agency is considering swapping its properties for municipally owned land because it has the potential to right size its parking areas and ensure that the most developable properties are made available for development.

For example, a community might own property adjacent to train tracks that includes commuter parking or other station facilities while Metra owns a parking lot on nearby property that is more appealing for residential use. If Metra and the community swap land, then the community can engage potential developers with building a residential or mixed-use development on the land that had been owned by Metra. In exchange, Metra can gain control of the station or parking facility that had been owned by the community in order to ensure that it remains in commuter use. This can help to right size the commuter parking for long term future demand.

Metra's planners appreciate how both TOD and affordable housing can help their agency. TOD is consistent with Metra's recent changes that have increased off-peak services. While traditional commuters parked at Metra stations in the morning and returned after work, TOD residents are more likely to use the railroad throughout the day and on weekends. Residents of affordable housing are often more likely to use transit than those who live in market rate housing.

Metra understands that affordable housing can be an important element of successful TODs but is not actively advocating for it. The agency considers that a topic which should be left up to communities.

An important consideration for Metra's planners is whether potential development could have any negative impacts to its riders. Metra wants to ensure that parking capacity will meet expected long-term demand, and the station will accommodate passengers who get rides from their family members, as well as bus riders, pedestrians, bicyclists, and rideshare users.

Minimizing total travel times for commuters is a critical and complex issue, especially when a parking deck replaces a surface lot. For instance, if Metra customers have to drive to an upper level of a parking deck located three blocks from a station, they might be deterred from traveling by train.

Metra's staff has quite a challenge. They do not control the zoning of station areas or own much of the land surrounding their stations, sometimes not even the station itself. Yet they are finding ways to advocate for transit supportive development and to encourage communities to make land use and zoning decisions that work for existing riders and expand ridership in the future. They also have to customize their efforts because Metra serves 243 stations in over 100 different communities located in a wide range of settings such as urban industrial areas, downtown communities, and in the midst of vast parking areas. The agency has started to develop an initial list of five to ten stations where it may be possible to right size the commuter parking and support new opportunities for TOD.

Examples of TOD and Housing

The first example, below, relates to how CTA worked with the community to lay the groundwork for future affordable housing as part of a large CTA capital project, while the second relates to RTA's Community Planning program.

Red and Purple Modernization Phase One[14]

Using an FTA grant awarded in 2016, CTA developed a TOD Plan for its $2 billion Red and Purple Modernization Phase One project. The project required the acquisition of properties in order to build new track structures, reconstruct four stations, and stage construction. After construction is completed, these eight CTA-owned sites will no longer be needed and will be available for redevelopment (CTA, 2018).

The purpose of the TOD Plan was to identify community-led goals and objectives for redevelopment in the neighborhood and to test specific, community-supported redevelopment strategies on the eight sites. The TOD plan developed a vision and principles for the sites that

included: promote diversity (cultural, generational, economic, family composition), encourage vitality (with commercial, commercial, retail, and civic uses), and seek to provide affordable housing options. The final report notes that private developers will be responsible for meeting the City of Chicago's affordable housing requirements.

Elements of the TOD Plan will be incorporated into future developer selection criteria and RFP documents when CTA is ready to dispose of properties.

Village of Orland Park[15]

This community, located 25 miles southwest of downtown Chicago, transformed an industrial area into a mixed-use town center anchored by the Village's 143rd Street Metra station. Key project elements included reconstruction of the existing station, new community park, 120,000 square foot medical center, and 295-unit apartment complex. The RTA Community Planning program helped pay for the village's plan in 2000. RTA did not emphasize affordable housing at the time and the development has included market-rate apartments, not affordable units (City of Orland Park; RTA, 2014).

Barriers to TOD and Affordable Housing

RTA planners noted the following barriers to ETOD and affordable housing:

- Communities in the Chicago suburbs have become more open to rental apartments, rather than just owner-occupied homes. However, some suburban communities still prefer market-rate rental units.
- RTA planners are encouraging communities to address equity issues by encouraging housing that is attainable at different price points. They find the response varies by community. One RTA planner said, "Having something in the plan is one thing. Then, getting something built is another slew of issues."
- In some communities, racial discrimination could be a factor associated with resistance to affordable housing.
- The term 'affordable housing' has a stigma. The planners sometimes hear, "we don't want affordable housing."
- Many suburban municipalities do not want to reduce their parking requirements and are wary of increasing density in station areas, if parking availability is an existing concern.

- Sometimes village boards are not supportive of TOD projects, even if they have adopted a plan that promotes it. The planners noted the benefits of municipalities establishing as-of-right zoning for TOD (when as-of-right zoning code is adopted, developers may be able to build TOD projects without obtaining any variances or discretionary approvals from local planning boards).
- Developers have said they are sometimes hesitant about TOD because they are unfamiliar with community preference and the approvals that would be needed.
- Even when the approval process is clear, the outcome is not. For example, some communities require developments to go through a Planned Unit Development approval process where the municipality can dictate design and density. The process can involve numerous steps for opponents to raise objections and derail projects.
- Developers in the city of Chicago face numerous bureaucratic hurdles when they try to develop housing and commercial properties. (The mayor has recently city outlined a program to "Cut the [Red] Tape." (City of Chicago, 2024))[16]

Key Lessons

RTA's planners noted the following lessons:

- RTA planners noted the benefits of municipalities establishing as-of-right zoning for TOD. It can help developers avoid obtaining approvals from local councils, zoning boards or planning boards. This can also help developers secure financing and incur up-front costs with greater confidence that their proposals will be approved.
- More communities in the Chicago suburbs are embracing form based codes to streamline their approval processes. Unlike conventional zoning codes which focus on how a property is used, form based codes focus more on how buildings relate to the streetscape and the public spaces between buildings (e.g., streets, parks, plazas). This gives developers more predictability because if a design conforms to the code, it can be built as-of-right rather than requiring approvals from political bodies (Chicago Metropolitan Agency for Planning, 2012).[17]
- Instead of the term "affordable housing," the planners often use the terms "workforce housing" and "attainable housing."
- In some circumstances, planners avoid the words 'dense' and 'density,' Instead, they use the terms: "more units", "variety of units", "creativity" and "diversity."
- TOD plans created for communities who own their own properties near rail stations have a greater success of getting implemented than plans that rely on owners of privately owned properties.
- Because property owners are having more trouble renting out retail space, developers are facing challenges obtaining financing for developments with ground floor retail.

Who We Interviewed

- Heather Mullins -- RTA's Division Manager, Local Planning and Program Management
- Alex Waltz -- RTA's Senior Planner
- David Kralik -- Metra's Director of Planning and Programming

Useful resources and innovative tools

Table C-3. Useful resources and innovative tools from Chicago

Resources	*Contents*	*URL*
Connected Communities Ordinance	City of Chicago.	https://www.chicago.gov/city/en/sites/equitable-transit-oriented-development/home/connected-communities-ordinance.html
RTA "Access & Parking Strategies for Transit-Oriented Development	Helps communities focus on prioritizing transit, bicycle, and pedestrian access.	https://www.rtachicago.org/uploads/files/general/Drupal-Old/documents/plansandprograms/landusetod/TOD_Parking_and_Access_Report_Web_Final.pdf
2023 Implementation Report	Summarizes activities and project awards for the RTA's Community Planning and Access to Transit programs.	https://storymaps.arcgis.com/stories/f27d8552781d4344a584dad4ae65fa59
RTA "Setting the Stage for Transit	Guidebook with information on best practices to encourage transit use for communities.	https://www.rtachicago.org/uploads/files/general/Drupal-Old/documents/plansandprograms/landusetod/TransitGuide_Interactive.pdf
City of Chicago ETOD Policy Plan	Overview of ETOD plan.	https://www.chicago.gov/content/dam/city/sites/etod/Pdfs/ETOD-Full-Policy-Plan-with-Appendices-6-15-21.pdf
Formed Based Codes: A step-by-step guide for Communities	Prepared by the Chicago areas' metropolitan planning organization.	https://cmap.illinois.gov/wp-content/uploads/CMAP-Form-Based-Codes-Guide-lowres.pdf

Chicago Endnotes

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Denver

Demographics

The U.S. Census data, in Table D-1, below, refers to Denver as well as its metropolitan area. Note that Denver has a consolidated city-county government.

Table D-1. Demographic Data

	Population	*Population Growth (U.S. Census Bureau) 2020 to 2023)*	*Size (sq. Miles)*	*Median household income (2022)*	*Travel Mode to work (2022)*
Denver-Aurora-Lakewood, Colorado Metro Area[1]	2,985,871	Increase of 1.2%[2]	8,345	$98,975 (Compared to $74,580 in the U.S.)	63% drove alone 24% worked at home 2% public transit (compared to 3.1% for transit in the U.S.)
Denver[3]	713,252	Decrease of 0.1%[4]	153	$88,213	56% drove alone 27% worked at home 4% public transit

Issues in Housing Affordability

A 2024 poll conducted for the Colorado Health Foundation found that 89 percent of surveyed residents said the cost of housing was an "extremely serious" or a "very serious" problem, making it the biggest concern in the state — higher than homelessness, cost of health care, crime, and the economy (Colorado Health Foundation, 2024).[5] As shown below, Denver is one of the least affordable regions in the country to rent or purchase a home.

Compared to the other case studies, the typical family in the Denver region is much less likely to earn enough income to qualify for a mortgage on a typical home, according to the National Association of Realtors' Housing Affordability Index.

Denver is a region where relatively few rental properties are available for low-income households. According to the National Low Income Housing Coalition, only 41 rental units are affordable and available for every 100 renter households at or below 50 percent of the area median income. The number of units across all major U.S. metropolitan areas is 56.

For more information about these indices, see Chapter 3.

Transit Agency: RTD (Regional Transportation District)[6]

The Regional Transportation District (RTD) provides bus and rail service to one of the geographically largest transit service areas in the United States. The district is over 2,342 square miles. Table D-2, below, provides general information about RTD (RTD, 2024; Tabachnik, 2024.)

Table D-2. RTD General Information

Feature	*Number*
Number of Buses	1,028
Number of Trains	201 light rail vehicles and 66 commuter rail cars
Bus Routes	More than 100 (including bus rapid transit routes)
Rail Lines	6 light rail, 4 commuter rail
Rail Stations	57 light rail, 27 commuter rail
Annual Ridership (2023)[7]	65 million (bus + light rail + commuter rail)

TOD Opportunities and RTD's Role

RTD light rail lines, which first opened in 1994, were mostly built in and near freight rail corridors and highways. Nearly every station was built with a large parking lot or garage. RTD operates more than 80 park-and-ride lots with over 37,000 parking spaces. Many of them are vast and underused.

For example, Wadsworth Station has a garage that can accommodate approximately 1,000 cars and was only 28 percent full in 2019. That was before ridership plummeted after the COVID-19 pandemic. The agency's largest park-and-ride lots each have more than 1,000 spots. None of them were more than 60 percent full in early 2024.

In the past two decades, extensive development has occurred in many neighborhoods served by RTD's rail lines. Although station areas make up only 0.6 percent of land area in the Denver metropolitan area, they contain 43 percent of multifamily homes and 55 percent of office space built between 2005 and 2022 (RTD, 2023).[8] Much of that development has occurred in the Union Station area. Private development in and around the station (as shown in Figure D-1) has

included nearly 1.9 million square feet of office, 250,000 square feet of retail, 3,000 residential units, and 750 hotel rooms (RTD, 2014).[9]

Figure D-1. Development in the Union Station area in 2016. Source: Wikimedia.[10]

RTD does not take the lead in promoting TOD. The agency leaves that role to municipalities, primarily to the cities of Aurora, Denver, and Lakewood. The City and County of Denver contains approximately 45 percent of RTD's stations.

RTD focuses its TOD efforts on the property that it owns. The agency is hesitant to get involved with property owned by other entities, although it does use its resources and expertise to encourage local jurisdictions to adopt TOD supportive policies, plans and zoning for areas within a 10-minute walk of its transit stations. The agency promotes a diverse range of housing options, including affordable units.

RTD's ETOD Policy[11]

RTD entertains offers to become a development partner, enter lease agreements, or sell property outright, as long as it does not limit RTD's access and operations. Typically, TOD projects on RTD property have been built by taking RTD-owned surface lots and creating mixed used developments with parking structures that accommodate transit customers as well as users of the new commercial and residential spaces (RTD, 2021).

In 2021, the RTD Board approved an ETOD policy whose goal is to "encourage affordable residential development for low-income households at and along high-frequency transit stations and corridors." The policy is expected to generate revenue through joint development on RTD real property, increase transit use, and enhance community relationships.

RTD defines "joint development" as a partnership between RTD and a public or private developer to improve agency property at an active transit facility. Joint development includes air rights development, ground lease arrangements, and sale of land (RTD, n.d.).[12]

The policy focuses on reducing the costs of development of affordable housing by:

- Reducing the number of parking spaces that developers must replace
- Considering the potential for shared parking
- Expediting internal reviews of developer proposals and potentially waiving processing and development review fees.
- Considering the development's full benefits when calculating sale/lease price

Low-income households use transit more: Before implementing the policy, RTD surveyed residents of 35 station-area apartments across the region and found that low-income households typically use buses and trains more than market-rate residents. Likewise, only 39 percent of low-income households have a car, compared to 93 percent of market-rate households who own at least one. This has given RTD an incentive to prioritize low-income housing near its stations.

Fair Market Value: Until recently, state law required developers to compensate RTD at fair market value and/or by providing services or capital improvements. At times, the agency was able to reduce the purchase price or rent for affordable housing development when it could show that the development would increase ridership and revenue. The state law changed in 2024 to give RTD even more flexibility. As part of a 2024 climate bill, the legislature repealed the requirement that fair market value be paid (Colorado General Assembly, 2024).[13]

Affordable Housing Goal: RTD set a non-binding goal that 35 percent of all housing developments on RTD property be affordable to low-income households (as defined by the Colorado Housing and Finance Authority). This goal is aspirational and non-binding. For each project, RTD works with the local government to set an affordable housing goal. If it is determined that affordable housing is not feasible or contradicts local governmental entities' adopted plans, zoning or regulations, then no goal is established.

Benefits of establishing ETOD policy: When the RTD's Board of Directors adopted its policy, the media attention generated a great deal of interest and conversations with developers, and improved RTD's reputation among many residents and policy makers. Furthermore, TOD efforts garnered more support and resources from departments within the agency.

Number of Parking Spaces[14]

Determining the appropriate number of required spaces for residents, commercial users, and transit customers for TOD projects is not straightforward. While RTD does not want the developer to build too many spaces, it will also not accept spillover parking from new developments into its existing park-and-ride lots (RTD, 2020.)

The agency's Parking Guiding Principles indicate that RTD will evaluate all decisions on parking based on the impacts to ridership and the financial, operational, and capital benefits to RTD.

Prior to 2021, RTD typically required developers building TOD projects on existing park-and-ride lots to incorporate the same number of new parking spots for transit users into their developments. With the 2021 ETOD policy, RTD can reduce the required number of spaces that must be replaced. This could make some projects more financially feasible because accommodating parking is costly. According to RTD, structured parking garages in 2020 cost $25,000 or more per parking space (or $5 million for 200 spaces.)

Eliminating the requirement that developers had to replace each parking space was a fundamental change for RTD. The agency had been hesitant to make this change because parking spaces were an important part of the original transit system design and some RTD officials were concerned that the unused space might be needed in the future. Parking revenue was not much of a factor in RTD's decision, though, since vehicles registered within RTD's boundaries can park for free at nearly all of RTD's parking lots for up to 24 hours.

RTD's own research indicates that residential developments near station areas typically have more parking spaces than needed at peak times. Before adopting its ETOD policy, RTD staff analyzed 86 private station-area properties across the region and found that residents used only 58 percent of all parking spaces provided at peak times. At income-restricted housing, only 50 percent were used. Thus, RTD can require developments with affordable homes to provide fewer parking spaces (per unit) than those with market-rate homes.

Evaluating TOD Projects and Prioritizing RTD's Sites[15]

RTD has two basic goals regarding TOD projects on its properties: increasing revenue and ridership. Revenues are generated through ground lease of its land (the agency will sell its land only in the rare instances where leases are infeasible). When evaluating ridership, RTD compares ridership that might be lost by reducing parking with the expected ridership increase generated by a new development.

In addition to revenue and ridership, potential developments must meet minimum impact thresholds in regard to transit operations, maintenance, safety, security, the local jurisdiction's preferences for the site, as well as its conformance to design best practices. TOD projects are also measured against additional, qualitative criteria including affordable housing as well as improved safety, security, upgraded rider amenities and access, community facilities, and enhancing RTD's brand.

To determine which sites have the greatest potential, TOD staff considers site size, zoning, parking utilization, infrastructure availability, local market conditions, community interest in redevelopment, and any unique site attributes or challenges.

For high priority projects, TOD undertakes a series of steps including the following:

- In-depth parking analysis (e.g., reviewing changes in utilization, monitoring parking over several days to determine any abnormal or inappropriate usage, surveying license plates at peak utilization to determine user origins)
- Development feasibility analysis (considering factors such as market readiness, zoning, infrastructure needs, community interest, and impacts to transit facilities.)
- Review parking reduction with RTD's service planning, capital programs, legal, and finance departments.
- Determine affordable housing goals
- If a development is financially feasible, then RTD may pursue a Request for Proposals/Qualifications.
- RTD's Board must approve the joint development agreement which is typically a ground lease.[16]

RTD also considers *unsolicited* proposals for a joint development initiated by a private developer and public entity. Since every development opportunity is unique, these unsolicited proposals are evaluated on a case-by-case basis.[17]

RTD Departments Involved with TOD

Table D-3 below identifies the different units within RTD and some of their roles in the TOD process.

Table D-3. RTD Roles and Responsibilities[18]

Unit	*Example of Role and Responsibilities*
TOD	Primary point of contact and coordinates internal review and evaluation

Real Property	Identifies property issues (e.g., how RTD site acquired, licenses, easements) and recommend price for any land transactions
Facilities Maintenance	Landscaping, mechanical, electrical designs. And, maintenance costs and responsibilities
Rail Operations	Rail facilities
Bus Operations	Bus transfer facilities
Service Development	Site layout, temporary accommodations needed for construction
Planning	Ridership impacts, number of parking spaces for cars and bicycles, need for separate bike/ped connections
Civil Engineering/ Urban Design	Site layout, urban design elements (e.g.,. landscaping, lighting), life cycle, separate utility needs
Finance	Implications related to tax- exempt financing, voter-approved debt authorization, overall financial plan, etc.
Legal	Legal documents
Safety/Security	Safety/security issues

Working with Local Governments, Developers and FTA[19]

RTD works with local governments, developers, as well as the FTA regarding TOD.

Only local governments are authorized by the State of Colorado to adopt plans, enact zoning codes, implement financing tools, and issue development permits. Local governments can build infrastructure that supports TOD, create urban design guidelines, and assemble land. In addition, they can also manage parking in their rights of way. In areas that have been planned for redevelopment, local jurisdictions can assemble land for economic development and utilize public financing to build public infrastructure and address project feasibility shortfalls.

RTD works with real estate developers to determine impacts to RTD facilities (e.g., transit parking, rail platforms, bus layover facilities, drainage ponds) and the phasing of the development so that it benefits transit riders, and promotes efficient transit facility operations. Real estate developers draft and finalize TOD site plans, obtain the necessary zoning and other approvals, secure financing for projects, complete any needed land assemblages, manage construction and complete projects.

Since the FTA funded much of RTD's system, the transit agency must obtain FTA's approval before selling or leasing any property purchased with federal funds. The FTA has regulations (FTA Circulars 7050.1C and 5010.1D) regarding proceeds of the revenue.

City / County of Denver

For decades, the City and County of Denver has encouraged high-density, mixed-use development near its stations. Referring to the city's adoption of a TOD strategic plan in 2006, Denver officials note, "The idea of having a more systematic approach to transit oriented development was a new, uncharted, and unproven idea."[20]

Today, most of RTD's sites with potential for TOD development are within Denver's city limits. RTD's TOD staff regularly meet with their city counterparts to discuss potential sites and development initiatives. As-of-right zoning that supports TOD is usually in place before projects are initiated by RTD or developers.

The city's population increased from 555,000 to 716,000 between 2000 and 2020. However, the number of applications for new residential developments has plummeted in the past two years because of a new state and city policy. In 2021, the state passed a law allowing local governments to require developers to include affordable units in new projects. The next year, Denver instituted a requirement that residential developments with 10 or more units include a specified ratio of affordable units. Prior to the policy taking effect, developers rushed to submit applications for new development at an unprecedented level. The city received applications for 16,408 new residential units in the second quarter of 2022 compared to 450 for the second quarter of 2023.[21]

Barriers to TOD and Affordable Housing

- Some communities outside of Denver oppose dense developments and affordable housing projects.
- Denver's requirement that residential developments include a specified ratio of affordable housing units may be deterring some TOD projects because developers need to price market rate units high enough to support affordable units.
- Until recently, there was more resistance within RTD than outside RTD for holding onto parking lots that were vastly underused.
- Not all RTD park-and-rides are developable. RTD has some parking lots surrounded by mountains that lack basic infrastructure and surrounding land use to support TOD.

Example of TOD and Affordable Housing[22]

In 2010, RTD selected a parking lot near its 27th & Welton light rail station as one of four TOD pilot sites for redevelopment. In 2016, RTD and the City and County of Denver partnered to oversee development of a for-sale affordable housing project. Through an RFQ, a developer was

selected for the 0.43-acre property; however, the developer was unable to undertake the project, and it was put on hold.

RTD released a second RFQ in 2022 and then selected a developer to construct the building and a non-profit community land trust to manage sales and own the land. Over the next two years, RTD staff worked with the developer to review project plans and help secure affordable housing funding from the city and state. RTD sold the property at a discount because of the affordable housing component.

A rendering of the project is shown in Figure D-2. All 62 units will be income-restricted to households earning up to 80 percent of the area median income. The project will consist of 62 affordable condos and ground floor retail. Notably, it will include only 26 parking spaces for cars, but 60 for bicycles.

Figure D-2. Rendering of the 27th and Welton TOD project. ***Source: RTD[23]***

Credit: RTD

Key Lessons

- A region with a new rail system, mostly built in and near freight rail corridors and highways, can be transformed into serving a growing population living and working near stations.
- A transit agency that encourages residential development for low-income households can generate more revenue, increase transit use, and enhance community relationships.

- After years of hesitation, RTD is now open to reducing the number of parking spaces that developers must replace when they build on RTD parking lots. The agency has been more willing to reduce the number of parking spaces for affordable housing after it saw research that indicated residents of affordable units were less likely to own a car and more likely to use transit services.
- An agency can help affordable housing developers by expediting internal reviews of proposals, and waiving processing and development review fees.
- Requiring a transit agency to receive fair market value for its land can make it harder to build affordable housing on its property.
- When an agency adopts a TOD policy, it can generate a great deal of interest and conversations with developers, improve its reputation among many residents and policy makers, and obtain more support for TOD projects from departments within the agency.
- RTD's research indicates that residential developments near station areas typically have more parking spaces than needed at peak times.
- Numerous agency departments need to be consulted on TOD projects, including those related to real estate, maintenance, operations, planning, engineering, finance, legal, safety, and security.
- A transit agency must obtain FTA's approval before selling or leasing any property purchased with federal funds. The FTA has regulations (FTA Circulars 7050.1C and 5010.1D) regarding proceeds of the revenue.
- When a city is getting ready to adopt a policy that requires new developments to include affordable units in new projects, developers may rush to submit applications before the policy goes into effect.
- Denver's requirement that residential developments include a specified ratio of affordable housing units may be deterring some TOD projects because developers need to price market rate units high enough to support affordable units.
- A law mandating local governments to adopt TOD supportive zoning near stations can be an impetus for new projects.
- RTD has had to deal with less NIMBYism than other cities regarding TOD, because their station areas are surrounded by parking with little historic character.
- TOD staff in an agency need to overcome silos within their agency in both informal and formal ways (e.g., attending meetings and social events, educating staff, etc.)
- A new state law, signed by the governor in May 2024, is expected to promote TOD and affordable housing. The law mandates local governments to adopt zoning that, basically, allows 40 residential units per acre near rail stations. These mandates apply to the Metro Denver region and certain other areas in the state.[24]

Who We Interviewed

Chessy Brady, Manager, Transit Oriented Development, RTD Planning Department
Alicia Leitgeb, Transportation Planner, RTD Planning Department

Useful resources and innovative tools

The following table, Table D-4, provides links to RTD's resources and innovative tools including policies, processes, and reports.

Table D-4: RTD's useful resources and innovative tools.

Resources	*Contents*	*URL*
ETOD Policy	Policy and related presentation to RTD Board.	https://cdn.rtd-denver.com/image/upload/v1697132069/Equitable_Transit_Oriented_Development_eTOD_Policy_g5wssx.pdf
TOD Policy Sourcebook	Identified TOD processes and the appendices include design standards and parking guiding principles.	https://cdn.rtd-denver.com/image/upload/v1725981050/TOD_Sourcebook_Final_20240905_j33g55.pdf
Parking Guide Principles	Board resolution providing guidance on parking issues.	https://cdn.rtd-denver.com/image/upload/v1697132438/Parking_Guiding_Principles_vngpyn.pdf
Unsolicited Proposal Procedure for Joint Development	Process, requirements, and timeline for evaluating developers' interests in redeveloping agency property.	https://www.rtd-denver.com/doing-business-with-rtd/unsolicited-proposal-procedure-for-real-property
2023 TOD Status Report	Annual report summarizing station-area development.	https://cdn.rtd-denver.com/image/upload/v1725921548/2023_TOD_Status_Report_vFINAL_pi6s7i.pdf
TOD Evaluation Guidelines	Principles and criteria used to evaluate TOD project.	https://cdn.rtd-denver.com/image/upload/v1697132470/TOD_Evaluation_Guidelines_dmr53r.pdf
Residential Parking in Station Areas	Survey of parking at RTD's station areas.	https://cdn.rtd-denver.com/image/upload/v1697484048/RTD_Residential_TOD_Parking_Study_gajmya.pdf
TOD Trend Tool	Analyzes property data from a national database focusing on all multifamily and	This tool is not available outside of RTD.

	commercial properties within ½ mile of stations.		
RTD TOD Team Property Database	Database tracks development within ½ mile of RTD stations.	https://www.rtd-denver.com/about-rtd/transit-oriented-development	

Denver Endnotes

Websites last accessed in October 2024 unless otherwise noted.

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[2] U.S. Census Bureau, "Metropolitan and Micropolitan Statistical Areas Population Totals and Components of Change: 2020-2023."

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[5] Colorado Health Foundation, "Pulse: The Colorado Health Foundation Poll," *Pulse Poll*, https://www.copulsepoll.org/.

[6] RTD, "Facts and Figures," https://www.rtd-denver.com/open-records/reports-and-policies/facts-figures; RTD, "TOD Policy Sourcebook," 2024; Sam Tabachnik, "Housing Development Is Coming to RTD's Park-N-Ride Lots, and the Agency Wants to Make It Easier," *Colorado Public Radio*, June 21, 2024.

[7] American Public Transportation Association. *2023 Q4 Ridership APTA Update*.

[8] RTD, "2023 TOD Status Report."

[9] RTD, "Denver Union Station," https://www.rtd-denver.com/about-rtd/projects/denver-union-station.

[10] Point00000, "Union Station Development," *Wikimedia Commons*, https://commons.wikimedia.org/wiki/File:Union_Station_Development.jpg.

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[13] Colorado General Assembly, "House Bill 24-214: An Act Concerning Modifications to the Affordable Housing Tax Credit," https://leg.colorado.gov/sites/default/files/2024a_214_signed.pdf.

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[15] "TOD Sourcebook."

[16] "TOD Sourcebook."

[17] RTD, "Unsolicited Proposal Procedure for Real Property," https://www.rtd-denver.com/doing-business-with-rtd/unsolicited-proposal-procedure-for-real-property.

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[21] "Scott Rathbun, "5 Quarters Later: An Examination of Denver's Inclusionary Housing Ordinance," Apartment Association Metro Denver, January 5, 2024; Colorado General Assembly, "House Bill 24-1313," https://leg.colorado.gov/bills/hb24-1313.

[22] Regional Transportation District, "29th & Welton Project," https://www.rtd-denver.com/about-rtd/projects/29th-welton; RTD, "Denver funds development of 62 permanently affordable condos in Five Points," June 18, 2024; S. Carter, "62 Affordable Condos Headed to Welton & 29th." *Naked Denver*, March 7, 2024.

[23] "29th & Welton Project."

[24] Marianne Goodland, "Colorado Gov. Jared Polis signs major housing bills, pushing high-density development," *Colorado Politics*, May 14, 2024.

Huntsville

Demographics

Huntsville, Alabama is one of the fastest growing cities in the country. It was named the second-best place to live in the United States by U.S. News & World Report in 2023. The city's thriving job market, low cost of living and high quality of life were cited as the primary reasons for its top ranking.[1]

Before World War II, Huntsville was a small city. After the war, its population soared from less than 17,000 in 1950 to more than 70,000 by 1960. The city had more than 100,000 residents by 1970 and more than 150,000 by the 1990s.

Since its growth coincided with a highway construction boom, the city's land use is oriented towards cars not transit. As shown in Table H-1 below, the Census Department reports that less than one percent of residents (in both the city and the metropolitan area) use transit to get to work.

Much of the region's growth has been tied to the rocket and space industries. NASA's Marshall Space Flight Center is located just outside of Huntsville's borders, about 7 miles from downtown Huntsville. The Center employs nearly 7,000 employees and has attracted a wide range of professionals and businesses (including Boeing, Raytheon, and Northrop Grumman.)[2] It is part of the Redstone Arsenal, a U.S. Army installation, which employs approximately 50,000 individuals. The arsenal is vast, comprising about 38,000 acres (nearly 60 square miles.)[3]

Huntsville is known for its reasonable commute times, even during peak periods. The city's mean travel time to work is 19.2 minutes compared to the national average of 26.4 minutes.[4]

The demographic information, in Table H-1 below, refers to both the city and the metropolitan area, based on the U.S. Census and American Community Survey.

Table H-1. Demographic Information

	Population (2023)	*Population Growth (2020 to 2023)*[5]	*Size (sq. miles)*	*Median household income (2022)*	*Travel mode to work (2022)*
City of Huntsville[6]	222,363	Increase by 4.2%	221	$68,930	79% drove alone 6% carpooled

					11% worked at home 0.1% took transit
Huntsville Alabama metro[7]	527,254	Increase by 6.6%	1,365	$84,929 (compared to $67,521 in U.S.)	76% drove alone 7% carpooled 14% worked at home 0.1% took transit (compared to 3.1% for transit in the U.S.)

Issues in housing affordability

Huntsville has had a recent boom in market-rate apartment construction. Between 2019 and 2022, the inventory of new apartments in the city of Huntsville increased by 9.3 percent, far exceeding the nation's average of 1.8 percent.[8] Over the next ten years, the rate of new construction in the city is expected to decrease substantially.

Average rent in the city is only $1,230 compared to $1,739 for the U.S. Its average apartment size is also larger -- 950 square feet compared to 900 for the nation.[9] The Low Income Housing Coalition Index does not measure the affordable and available units for the Huntsville area.

Compared to the other case studies, the typical family in the Huntsville region is much more likely to earn enough income to qualify for a mortgage on a typical home, per the National Association of Realtors' Housing Affordability Index.

For more information about these indices, see the Introduction to the Case Studies.

Transit and the Transit Agency[10]

The current transportation network is heavily oriented toward automotive traffic, and that is unlikely to change in the near term. As noted in the city's master plan -- like many cities that experienced heavy growth during the latter half of the 20th century, the vast majority of the transportation infrastructure supports the automobile.

Bicycle facilities are sparse, and safe cycling, be it for commute or recreation, can be a challenge. The sidewalk network is fractured and inconsistent, and even where sidewalks exist, in many cases they are not in a particularly well-designed pedestrian environment.

The city of Huntsville began running fixed-route bus service in 1990 in response to the growing population and traffic congestion. The system, now known as Orbit, is owned and operated by the city, and is funded by city and federal funds.

The service is designed to meet the needs of low-income residents. The fare is only $1 and a monthly pass costs only $30. Seniors, Medicaid card holders and students pay only that amount.

Orbit's services are limited. The bus only operates Monday through Friday between 6 a.m. to 9 p.m., and on Saturday from 7 a.m. to 7 p.m. There is no service on Sundays. Orbit does not serve Redstone Arsenal because the Department of Defense does not allow the Orbit buses to operate on its property.

Service runs every 60 minutes on seven routes and every 30 minutes on three routes during weekdays.

A transit improvement plan conducted by the city's consultants called for Sunday service, extending service hours, adding buses, and increasing frequency. Fully implemented, this would require doubling the number of buses operating during peak periods.[11] Table H-2 provides the general information for Huntsville's public transportation.

Table H-2. Huntsville Public Transportation Information

Feature	*Number*[12]
Number of Buses	25 buses (with 28 passenger capacity) for fixed route service.
Number of Trains	N/A
Bus Routes	10
Rail Lines	N/A
Rail Stations	N/A
Annual Ridership	631,000 (2023)[13]

Accommodating Growth and the BRT Plan[14]

The city's rapid growth has led to notable challenges relating to traffic congestion, environmental concerns, and infrastructure demands. Since growth is expected to continue, the city has been considering transit improvements and TOD to accommodate that growth.

In recent years, the FBI has been moving headquarters staff from the Washington D.C. area to Huntsville. Many of the new residents have been clamoring for better public transportation.

In 2022, the Huntsville MPO completed a High-Capacity Transit Concepts & Corridors Plan, which examined existing and future population, employment, and land use in order to identify corridors with potential for high-capacity transit.

A light rail line option was ruled out because BRT can be constructed at 5 to 10 percent of light rail's cost. A BRT system is expected to cost between $55 million and $65 million in 2022 dollars, assuming level boarding stations, off-board fare payment, improved station amenities, better pedestrian access, some transit priority treatments. The city is considering service every 10 to 15 minutes with the understanding that this would require new buses and lead to much higher operating expenses.

The study considered different alternatives for accommodating buses along BRT routes. Although dedicated lanes would offer the most time savings, the city has been leaning towards mixed traffic operations for most of the route. This option is more flexible, less expensive, and can be implemented more quickly.

The city is now pursuing an 8.9-mile long BRT corridor with 32 stations that would run primarily on University Drive and serve several key employment and activity centers,

Huntsville will be seeking an FTA Capital Investment Grant Small Starts grant with the city expected to contribute somewhere between $14 and $33 million. City officials are hoping to offset the project cost by developing partnerships with local firms and organizations. One potential partner is Huntsville Hospital which is interested in promoting the development of affordable housing and improved transit services for its workers.

Huntsville is planning on increasing frequency on its Route 4 (University Drive) service, which operates a similar route to the planned BRT service. The city expects this will boost ridership and also help it be more competitive in the FTA's Small Starts program.

The BRT project is in the very early planning stages. Although a locally preferred alternative has been selected, Huntsville still needs to complete the environmental review process, identify a local funding source, and compete for FTA funds. After that, it can complete engineering and design, construct the BRT, and acquire new buses.

The region's transportation planners hope that BRT can revolutionize public transportation in Huntsville and lead to a regional transit system.

TOD Study[15]

In May 2024, the city of Huntsville was awarded a $850,000 FTA grant to plan for TOD along the proposed BRT line. The project is 100% federally funded, with no local or state match required.

The project is emphasizing three key areas with the greatest potential for TOD:

- Northwoods (a 447-unit public housing development)
- University of Alabama in Huntsville (which is seeking to create a mixed-use development with student housing, research building, commercial office space, and retail/entertainment.)[16]
- MidCity District (a mixed used area on land that was formerly a shopping mall)

In the summer of 2024, the city issued an RFP for consultants to conduct a TOD planning study. The consultants will perform the following:

- help lead educational activities (including workshops/public meetings) with the public and elected officials, and local developers
- develop station area concept plans (including street plans and building layouts for station areas,)
- recommend station area regulations, design standards, & policies
- recommend expanding infrastructure in station areas (including streets, bike and pedestrian improvements, parking).
- identify incremental value capture revenue opportunity

The City of Huntsville is now undertaking both its BRT and TOD planning efforts, simultaneously. There is some overlap between the consulting groups conducting the studies. The consultants are assisting the city with its efforts to obtain FTA Capital Investment Grant funds.

Affordable Housing

In 2024, the FTA's "Pilot Program for TOD Planning" fully funded TOD planning studies which included a substantial focus on affordable housing. Huntsville's TOD application met that standard. As part of the city's TOD planning, city officials are now considering rewriting the zoning ordinance to encourage more affordable housing. Potential strategies include reducing parking minimums along high frequency transit corridors, and establishing more zones that could accommodate duplexes and accessory dwelling units. In addition, the city may offer a bonus (such as allowing additional building height) for developments that have affordable housing.

Obstacles and Challenges

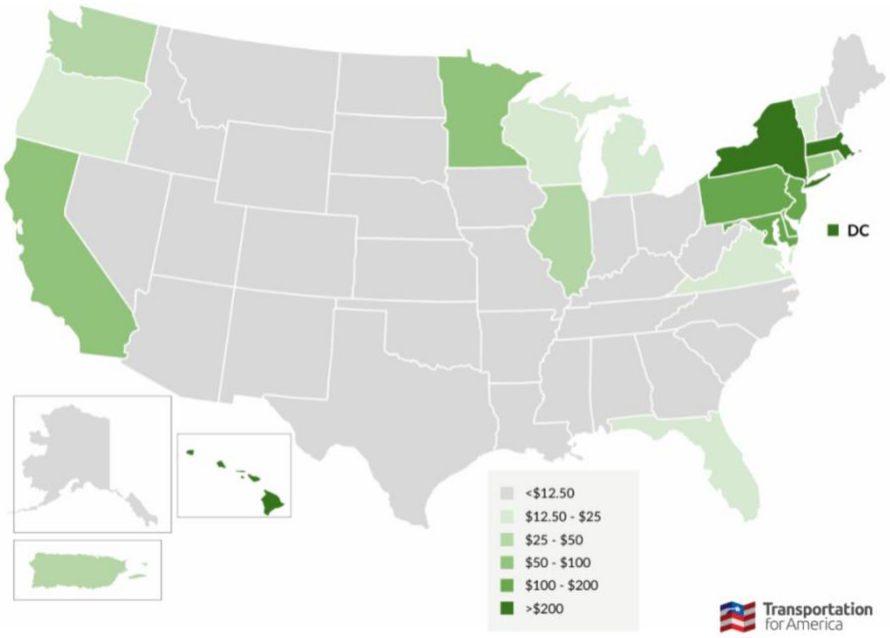
The city understands the challenges of promoting TOD without a BRT in place, especially since the population of the existing BRT corridor is not densely populated.

The city's manager of Urban and Long Range Planning, said "One of the challenges in planning for transit is that a lot of times you want to have ridership before you're willing to make the investment in transit. You want to know that you've got riders that you're actually serving, but

it's also hard to get riders without showing them that transit is actually happening. So, there's a little bit of a kind of a chicken and an egg thing going on there."[17]

Huntsville has a funding challenge. The following map, Figure H-1, shows states' contribution to transit spending per capita as of 2021.

Figure H-1. State funding. Source: Transportation for America[18] (copyright permission pending)



As shown in this map, many of the regions discussed in this case study report (Bay Area, Chicago, New Jersey, Seattle, Twin Cities) are among the most generous states when it comes to funding transit. The state of Alabama is the least generous because it does not provide any funds to support transit.

Unlike many other states, Alabama does not use any gas taxes to support transit. In fact, a 1952 amendment to the state's constitution forbids it.

The state did set up a Public Transportation Trust Fund in 2018, but it has never funded the program. In 2024, lawmakers considered a bill that would have provided about $26 million per year to the trust fund by adding $5 to vehicle registration fees. But a State Senate committee voted it down.[19]

Key Lessons

Huntsville's TOD supporters include the Huntsville-Madison County Chamber of Commerce, the University of Alabama, Huntsville Hospital, and the local congressman. Huntsville's planners believe they have received widespread support with minimal opposition because of their community engagement efforts. Before going public with potential BRT corridors and TOD sites -- the planners identified community needs and talked to potential partners.

In some instances, city officials have met resistance to the term affordable housing because of a concern that affordable housing would lower property values. To avoid those concerns, officials point to studies that indicate property values do not decrease. Rather than use the term "affordable housing," they sometimes refer to "workforce housing," or "housing for nurses, first responders, and teachers."

Who We Talked to

James Vandiver, transportation planner for the City of Huntsville.

Useful resources and innovative tools

Table H-3. Huntsville's useful resources and innovative tools

Resources	*Content*	*URL*
Go Huntsville Transit	Evaluation of the city's transit services with a series of recommendations to improve service quality and create a more equitable transit network.	https://www.huntsvilleal.gov/wp-content/uploads/2023/03/Go-Huntsville-Transit-Final-Report.pdf
The Big Picture	City of Huntsville's comprehensive master plan.	https://bigpicturehuntsville.com
TOD Planning Projects	FTA projects awarded grants in Fiscal Year 2023 (including Huntsville).	https://www.transit.dot.gov/funding/grants/grant-programs/fiscal-year-2023-transit-oriented-development-tod-planning-projects
Huntsville MPO High-Capacity Transit Concepts & Corridors	Assessment of several corridors to understand the region's travel patterns and identify the appropriate technology, operating scenarios, and capital costs required to implement an efficient and equitable transit service.	https://www.huntsvillempo.org/wp-content/uploads/2022/09/Huntsville-HCT-Concepts-and-Corridors-Plan-Brochure_20220914.pdf

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10 City of Huntsville, "Public Transportation," *City of Huntsville*, accessed October 14, 2024, https://www.huntsvilleal.gov/residents/streets/public-transportation/; *The Big Picture*.

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Minneapolis-St. Paul Region

Demographics

The U.S. Census data in Table M-1 below refers to the Minneapolis-St. Paul-Bloomington metropolitan area (also known as the Twin Cities region) and separately to the region's largest city, Minneapolis.

Table M-1. Demographic information for the Twin Cities region and cities of Minneapolis and St. Paul

	Population	*Population Growth (2020 to 2023)*	*Size (sq. Miles)*	*Median household income (2022)*	*Travel Mode to work (2022)*
Metro Area[1]	3.7 million	Increase of 0.5%[2]	7,047	$91,341 (Compared to $74,580 in the U.S.)	66% drove alone 21% worked at home 2% public transit
City of Minneapolis[3]	425,000	Decrease of 1.3%[4]	54	$74,473	55% drove alone 24% worked at home 7% public transit
City of St. Paul[5]	303,160	Decrease of 2.4%[6]	52	$67,725	60% drove alone 19% worked at home 5% public transit

Issues in Housing Affordability

The Minneapolis-St. Paul-Bloomington metro area has approximately 1.6 million housing units.[7] Single family units account for 70 percent of total housing units and multi-family units account for 28 percent.[8]

According to the National Low Income Housing Coalition, the Twin Cities metro area faces a deficit of 79,282 affordable and available units. However, some data suggests that the city of Minneapolis is on a path of expanding housing availability. Between 2017 and 2022, the city saw a 12 percent increase in housing units and a one percent increase in average rent, meaning Minneapolis was able to increase housing stock and keep rent growth low.[9]

Compared to the other case studies, the typical family in the Twin Cities area is much more likely to earn enough income to qualify for a mortgage on a typical home, per the National Association of Realtors' Housing Affordability Index.

The Twin Cities region has a higher number of rental properties available for low-income households than any other case study, except the state of Alabama. According to the National

Low Income Housing Coalition, there are 61 affordable and available rental units for every 100 renter households at or below 50 percent of the area median income. The number of affordable and available units across U.S. major metropolitan areas is 56.

For more information about these indices, see the Introduction to the Case Studies.

Transit Agency: Metro Transit

A vast streetcar network stretched across the Twin Cities during the early 20th century, covering much of Minneapolis, St. Paul, and the surrounding suburbs. However, with the rise of the automobile and the interstate highways, the streetcars were eventually phased out.

In 1967, the state of Minnesota created the Metropolitan Transit Commission (now known as Metro Transit). In 1994, it became a division of the Metropolitan Council, the twin cities' metropolitan planning organization (MPO).

Metro Transit returned rail transit service to the Twin Cities with the Blue Line which opened in 2004. Metro Transit also operates the Green Line, Northstar commuter rail, and BRT lines. It is currently building additional BRT lines and extending its light rail lines.

Metro Transit covers an area of around 900 square miles, serving 76 cities in over 7 counties across the Minneapolis-St. Paul region.[10] Table M-2 shows the transit information for Metro Transit.

Table M-2. Transit information for Metro Transit

Feature	*Number*
Number of Buses	628
Number of Trains	118 light rail vehicles and 19 commuter rail cars
Bus Routes	156 (includes 5 bus rapid transit routes)
Rail Lines	2 light rail, 1 commuter rail
Rail Stations	37 light rail, 7 commuter rail
Annual Ridership (2023)[11]	45 million (bus + light rail + commuter rail)

Roles and Responsibilities Regarding TOD

Cities

Cities in the Met Council region regulate development, as well as coordinate and collaborate with multiple property owners, neighborhood groups, and between different levels of government. Their core responsibilities include comprehensive and station area planning, land

use regulations, public infrastructure planning, and their role as a redevelopment and economic development authority.[12]

Counties

Counties in the Met Council region do most of the initial analysis and planning for light rail projects before projects transition to Metro Transit at about the 15% to 30% design phase. The counties help fund transit capital and operating costs. In addition, counties plan and design county roadways and rights-of-way, which can influence the character of development near transit.[13] Minneapolis is located in Hennepin County and St. Paul is in Ramsey County. The counties often invest in TOD projects through multiple funding sources such as Ramsey County's environmental response fund.

Metro Transit

The Metro Transit TOD office was first established in 2013. It provides information on development opportunities and transit projects. The office promotes itself as a "one-stop shop for developers and urban planning professionals interested in pursuing or advancing TOD."[14]

Metro Transit acquired land to build BRT and light rail projects and advances TOD on properties that it no longer needs. Affordable housing is a goal for many of its sites.

Metro Transit conducts studies and issues reports relating to TOD. Its 2023 "Development Trends Along Transit" report analyzed permits issued for development between 2009 and 2022, and found the following:[15]

- $16.4 billion in planned development along high frequency transit corridors. That is 37 percent of the total development value, and it is located in a geographical area that represents just 3.2 percent of the region's land area. 36,900 multifamily units are currently planned along high frequency transit, representing 47 percent of the units planned in the region.
- 44 percent of planned development value in the region is mixed use. 60 percent of mixed-use development planned near high frequency transit.
- 41% of all multifamily affordable housing units are located near high frequency transit

For deeply affordable multifamily units (affordable for households earning up to 30 percent of the region's annual median income), 83% have been located near high frequency transit.

Metropolitan Council

Met Council's TOD policy, adopted in 2013, is designed to advance four main goals:[16]

- Maximize development impact of transit investments
- Support regional economic competitiveness by leveraging private investment
- Advance equity by improving multimodal access
- Support a 21st transportation system through increased ridership and revenues

The Met Council's TOD Guide (first published in 2006 and regularly updated online) is designed to[17]:

- Explain the roles and responsibilities of each level of government in planning and implementing TOD.
- Address the importance of market demand and the needs of people most dependent on transit.
- Emphasize implementation.
- Share case studies and best practices
- Help local planners build and share knowledge

Met Council's TOD Prioritization Tool is a guide for prioritizing TOD implementation. The tool identifies various types of station areas (based on the existing urban development and the real estate market) and then identifies the most effective strategies in implementing TOD at each type. For example, the tool recommends that cities with strong real estate markets and easy access to transit should retain affordable housing and strengthen walkability. In station areas with limited infrastructure to support walking, the tool recommends generating support for a long-term vision and identifying infrastructure needs.[18]

Grant Programs

Met Council awards grants to cities and townships under its Livable Communities program which provides funding for:[19]

- Development and redevelopment projects that link housing, jobs and services.
- Projects that contribute to a mix of uses in TOD-eligible areas along light rail, commuter rail, BRT, and high frequency bus corridors.
- Pre-development grants to define and redefine projects.
- Policy development program funds to support locally adopted policies influencing physical development.
- Programs to expand and preserve affordable rental and homeownership housing.

Counties have their own TOD grant programs. For example, Hennepin County's Transit Oriented Communities program provides funding for the renovation and expansion of housing, mixed-use and commercial projects as well as public infrastructure projects and property acquisition.[20]

Ramsey County's Critical Corridors program offers assistance for projects that intensify land use, facilitate development of multi-family housing, improve pedestrian/bicycle infrastructure, and promote development without displacement.[21] The program gives high priority to projects that encourage affordable housing.

Zoning and Parking in Minneapolis[22]

In January 2004, Pew Charitable Trusts reported that "Minneapolis' success in building new apartments has enabled the city to substantially add to its housing supply and keep rent growth low." Between 2017 and 2022, Minneapolis increased its housing stock by 12 percent while rents grew by only 1 percent. Over the same period, the rest of Minnesota added only 4 percent to its housing stock while rents went up by 14 percent.

Pew credits four policies that have allowed Minneapolis to expand its housing supply:

- Eliminating minimum parking requirements for new developments.
- Encouraging apartment development on commercial corridors.
- Establishing building height minimums in high-density zones.
- Permitting duplex and triplex construction on all residential lots.

Barriers to TOD and Affordable Housing

The following are barriers to TOD and affordable housing, noted by Met Council and County staff.

Local Resistance

- Some developers will come forward with TOD projects that include affordable housing. Communities might support the TOD component but resist the affordable housing element.
- Zoning codes can be adopted that make it harder to build affordable units.
- Some communities allow land uses near stations that should be seen as incompatible, such as drive-in banks.
- While there has been support for TOD and affordable housing work in the region, staff note that affordable housing has some negative perceptions. Community opposition, especially in the suburbs, can be a major obstacle to building more affordable housing.
- Some people think that TOD means affordable housing, although they do not necessarily associate affordable housing with TOD.

Coordination and Financing

- With construction costs and interest rates driving up TOD construction projects, the need to make up for the increased cost may fall on residents in market rate units.
- Some partnerships can present challenges. A private developer might have parking requirements for a project, or its financial backers may be resistant to mixed-income development. Developers may propose two buildings with different amenities for different incomes, although staff indicated that this should no longer be standard practice.

- Metro Transit wants to see population and density in place before it plans on extending bus services. That means some communities are planning walkable and compact neighborhoods that may be served with only limited bus service or even no service at all.
- Met Council and the counties TOD efforts are often more reactive than proactive. They tend to wait for communities to come to them with ideas.
- With over 180 units of government, it can be challenging to coordinate between so many units of government. The level of coordination is different among the various units of government. A city of 5,000 in an outer suburban ring may be more resistant to TOD than the city government.

Examples of TOD and Affordable Housing

Hamline Station

A TOD project adjacent to St. Paul's Hamline Station on the Green Line includes two 4-story mixed-income, mixed-use apartment buildings and a central public plaza, shown in Figure M-1. Residents are within walking distance of retail, regional job centers, and recreational space. The project redeveloped a vacant used car dealership into a mixed-income and mixed-use space. There are 108 residential units, with 14 units designated for previously homeless and/or disabled persons and 94 units reserved for families earning at or below 60 percent of the average median income. Met Council provided funding for land acquisition and utility line relocation.[23]

Figure M-1. Hamline Station. Source: Met Council (copyright permission pending)

Mixed-Income at 2700 University

This project near the Metro Green line in St. Paul is an example of a mixed-use and mixed-income project, shown in Figure M-2. Residents have equal access to a high level of amenities regardless of how much they pay in rent. The amenities include community space, fitness rooms, and large outdoor pool deck with grills, seating areas, and pergolas. The project provides a lower parking ratio (0.8 per unit) compared to what developers in the area have sought. There are 248 residential units and 20 percent of those units are affordable to households earning at or below 50 percent of the average median income.[24] Met Council provided a $1.9 million Livable Communities Grants to help pay for land acquisition, land surveys, and public improvements.[25]

Figure M-2. 2700 University Development (copyright permission pending)

Mill City Quarter

The Mill City Quarter TOD project saw the redevelopment of a former surface parking lot next to an abandoned railroad right-of-way, in downtown Minneapolis. The project consists of two buildings separated by the historic railroad right-of-way converted into plazas, raingardens, and bike/pedestrian pathways. The project is in a mixed-used corridor, giving residents access to retail, green space, and multiple transit options along the Metro Green and Blue lines. There are 250 housing units, with 125 affordable units. Met Council provided Livable Communities Grant funding for utility relocation, underground parking, green roof, trail connections to the Mississippi River, public space between buildings, and geotechnical analysis.[26] Figure M-3 shows the site during and after construction.

Figure M-3. Mill City Quarter, before and after photos. Source: Met Council (copyright permission pending)

Before

After

Key Lessons

According to staff from Met Council and Counties:

Financing

- In some cases, it is now easier to finance affordable housing developments than market rate housing because of low-income housing tax credits.

Catalyst

- The light rail system has been a catalyst for more transit-oriented development.

Transit Oriented Communities

- Met Council's focus has shifted its focus from individual TOD projects to "transit-oriented communities."

- Transit agencies should not be hyper focused on a single site and lose context of the community. Framing the conversation around communities rather than TOD creates a holistic approach towards integrating projects in neighborhoods where pedestrians and bicyclists feel safe, and people do not need cars.
- Agencies should not promote affordable housing at the expense of developing quality transit-oriented communities. A diversity of housing is also important.
- Met Council and the Counties both promote increasing transit options and developing street infrastructure that makes people feel safe.
- Planners often consider the corridor as the community. Putting up affordable housing is not an effective TOD unless residents have easy access to the station and frequent transit service.

Planning and Community Engagement

- In retrospect, Metro Transit could have incorporated TOD for the Blue Line into its initial planning efforts. It could have built stations in locations that were more conducive to TOD. And it could have worked with communities on changing zoning codes in advance of construction. It learned those lessons for the Green Line.
- The cities no longer need as much engagement and assistance regarding TOD as the suburban communities do. Met Council and the counties are shifting their outreach efforts more towards suburban communities.
- Land use and zoning are critical elements of TOD and affordable housing.
- Transit agencies are often focused heavily on a transit line, but they need to engage with jurisdictions on guiding desired change.

Coordination

- Since cities have land use controls, regional planning bodies need to coordinate with them.
- Since Metro Transit is a division of Met Council, the transit agency is a more effective advocate for TOD policies. They can look at development opportunities together, relating to both existing and new transit services. Moreover, Metro Transit has strong ties with other Met Council divisions including its Housing and Redevelopment Authority.

Land Use

- When municipalities allow TOD as-of-right rather than requiring approvals, the development process is faster and less likely to stall because of community opposition.

Funding

- Met Council's newest grant program provides funds to programs that will realize more equitable development outcomes beyond individual projects (such as hiring a consultant to develop new land use regulations).

- Try not to be too rigid about allocating TOD-related funds.
- Affordable housing should be constructed in a way that minimizes ongoing operating costs. Likewise, it would be helpful to fund operations and supportive services (including projects to help unhoused individuals).

Who we Interviewed

- Sarah Berke-- Senior Manager, Livable Communities & Housing Policy, Metropolitan Council
- Michael Krantz-- Senior Manager, Transit-Oriented Development, Metro Transit TOD Office
- Ella Mitchell—Redevelopment Manager, Ramsey County
- Ryan Kelley-- Community Development Manager, Hennepin County Housing & Economic Development

Useful resources and innovative tools

Table M-3. Twin Cities useful resources and innovative resources

Resources	*Contents*	*URL*
TOD Policy	Adopted by Metro Transit in 2013. Summarizes TOD policy goals.	https://www.metrotransit.org/Data/Sites/1/media/tod/tod-policy.pdf
Metro Transit 2023 Development Trends Report	Summary and analysis of permitted and planned development in the region, especially near high frequency transit.	https://www.metrotransit.org/Data/Sites/1/media/tod/2023devtrendsalongtransitreport.pdf
Met Council TOD Guide	Designed for local planners, elected officials, planning commissioners, and other interested parties.	www.metrocouncil.org/Communities/Planning/TOD.aspx
Met Council TOD Prioritization Tool	Categorizes TOD station areas and provides policies for TOD implementation.	https://metrocouncil.org/Communities/Planning/TOD/Files/TOD-Prioritization-Tool-Factsheet.aspx
Met Council Livable Communities Grants programs	Summarizes different grant programs in the Livable Communities program, amount of funding available, and eligibility requirements.	https://metrocouncil.org/Communities/Services/Livable-Communities-Grants.aspx

Met Council Roles	Summarizes different roles and responsibilities of the counties, cities, and the Met Council.	https://metrocouncil.org/Communities/Planning/TOD/Roles-Support.aspx
Met Council's Thrive MSP 2040	Long term regional plan, adopted in 2014	https://metrocouncil.org/Planning/Thrive-2040.aspx
Ramsey County: Critical Corridors Program	Webpage summarizing the program and links to selected projects.	https://www.ramseycounty.us/businesses/property-development/property-development-programs-incentives/critical-corridors-programs
Hennepin County Transit-Oriented Communities	Information on the county's transit-oriented communities program.	https://www.hennepin.us/en/economic-development/programs/transit-oriented-development#Application

Minneapolis-St. Paul Endnotes

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New Jersey

Demographics

The U.S. Census data, shown in Table N-1, refers to demographics for the entire state of New Jersey because NJ TRANSIT provides service across the state.

Table N-1. Demographic information for New Jersey

State Population	*Population Growth*	*Size (sq. miles)*	*Median household income (2020)*[1]	*Travel mode to work (2022)*[2]
9.3 million (2023)	1.2% between 2020 and 2023[3] (compared to 1.0% in U.S.)	7,353 sq miles (state) 5,325 (NJ Transit service area)	$96,346 (compared to $67,521 in U.S.)	65% drove alone 8% carpooled 13% worked at home 9% transit (compared to 3.1% for transit in the U.S.)

Issues in housing affordability

Home Buyer Index

The National Association of Realtors Affordability Index[4] ranges across the state of New Jersey.

In north Jersey, the typical family in the Twin Cities area is much more likely to earn enough income to qualify for a mortgage on a typical home in North Jersey than in South Jersey, per the National Association of Realtors' Housing Affordability Index.

According to the National Low Income Housing Coalition, in the northern part of New Jersey (closer to New York), there are only 46 affordable and available rental units for every 100 renter households with incomes at or below 50% of area median income. In major U.S. metropolitan areas, that number is 56. A higher proportion of units, 61, are affordable and available in the southern part of the state (near Philadelphia).

See the Introduction to the Case Studies for more information about these indices.

Transit Agency: NJ TRANSIT[5]

Table N-2. NJ Transit agency information

Feature	*Number*
Number of buses	2,221
Number of trains / light rail vehicles	1,324
Bus routes	253
Rail lines	12 commuter rail and 3 light rail
Annual Ridership (2023)	209 million
Number of rail stations	166

NJ TRANSIT was founded in 1979 to acquire, rejuvenate, and operate the bus, light rail, and commuter railroads that were built by private companies but had become financially insolvent in the post-war period. NJ TRANSIT also acquired some, but not all of the former companies' real estate holdings, and the property acquired was by and large needed for transit operation and support functions. Over the last 45 years some of this property has been strategically made available for TOD purposes.

Evolution in thinking about TOD

TOD is not new to New Jersey. In the 19th and early 20th centuries, many of its towns and cities developed around their train stations and streetcar lines that were constructed by private companies. For the past three decades, NJ TRANSIT's planning department has been promoting TOD. In 1994, it published a "Planning for Transit Friendly Land Use" handbook.

TOD responsibilities are split at NJ TRANSIT between its Real Estate Office and the Planning Department. The Real Estate office focuses on NJ TRANSIT-owned property while the Planning Department focuses on properties near its stations and station area planning.

In 2018, NJ passed law a bill that required NJ TRANSIT to establish the Real Estate Department's TOD office and conduct an annual inventory of its real estate holdings, potentially paving the way for new opportunities across the state.[6]

NJ TRANSIT owned property

- NJ TRANSIT owns multiple properties where a major development could potentially get built; however, much of its planning activity relates to properties owned by others.
- NJ TRANSIT takes a long-term approach to land sales, using a multi-factor approach, not just price, to determine whether or not a particular parcel should be sold or leased. For

example, it would not sell land to the highest bidder if a developer were only interested in putting up a convenience store at a site.

Promoting TOD on Adjacent Property

- Historically, NJ TRANSIT has focused on TOD around train stations; however, the agency has expanded its focus to include high-frequency bus corridors.
- While NJ TRANSIT owns some properties that are ripe for development, it cannot zone land or regulate land uses, as these responsibilities fall under the jurisdiction of local government. Thus, NJ TRANSIT emphasizes collaboration, technical assistance, education, and partnerships with municipalities across the state.
- NJ TRANSIT has close partnerships with the state's three metropolitan planning organizations and state agencies such as the Department of Community Affairs to educate communities on TOD. This department was created to provide administrative guidance, financial support and technical assistance to local governments, community organizations, and businesses. It administers an Affordable Housing Trust Fund Program that provides municipalities, for-profit and non-profit developers with financial assistance.[7]

Publications

- NJ TRANSIT published in 2022, a 90-page document "Transit Friendly Guide: A Guide for New Jersey Communities" to assist communities in "making land use decisions that assist in improving mobility and access to transit." This Guide is meant to promote TOD in New Jersey by assisting municipalities, developers, state agencies, and other interested stakeholders with implementing transit-friendly planning concepts around transit facilities and promoting TOD in New Jersey communities. The Guide provides recommendations and identifies resources regarding design and development, access, circulation, and parking. One of the TOD program's goals is to ensure that all development around its facilities prioritizes equity, including the incorporation of affordable housing.[8]
- NJ TRANSIT published a TOD Policy Statement in April 2024, which identifies TOD's benefits, the agency's goals, objectives, and implementation actions for TOD within a half mile (or ten-minute walk) of rail and bus stations, as well as stops on high-frequency bus routes, and supporting policies relating to development located wholly or partially on NJ TRANSIT-owned or controlled land. The agency, per state law, requires 20 percent of newly built residential units in TOD projects on land owned or controlled by NJ TRANSIT to be reserved for low- and moderate-income households. If NJ TRANSIT does not own the entire development site, the required number of affordable units will be 20 percent of the units attributed to its portion of the development site.[9]

TOD in New Jersey

Affordable Housing Requirements in NJ

New Jersey has a long history of legally guaranteeing the production of affordable housing, collectively known as the Mount Laurel decisions. In 1975, the NJ Supreme Court held that all New Jersey municipalities are responsible for their "fair share" of affordable housing. The court subsequently set up a system of enforcement including allowing a developer to sue a municipality if it does not permit more housing construction.

In 1985, the New Jersey Legislature passed the Fair Housing Act, which codified the affordable housing obligations of municipalities and created the Council on Affordable Housing to define housing regulations, estimate housing needs, set criteria and guidelines for municipalities to create housing.

Per state law, "moderate income housing" refers to households with a gross household income equal to more than 50 percent but less than 80 percent of the median gross household income for households of the same size within its region. "Low income" refers to housing affordable to families at 50 percent or less.[10]

NJ TRANSIT's Partnership Programs

- NJ TRANSIT and Rutgers University's Voorhees Transportation Center publish a weekly "Transit Friendly Planning Newsletter" designed to keep municipal officials, planners, and advocates updated on the potential for development and redevelopment around transit stations. The Vorhees Center also conducts and shares TOD-related research (e.g., benefits of transit friendly planning, its effect on housing values, guides to implementation).11
- NJ TRANSIT and Rutgers developed a "Transit Friendly Data Application" which provides TOD-related data (demographics, land use, environmental conditions, real estate, and transit availability) for different geographic areas such as station areas.
- NJ TRANSIT has a representative on numerous boards including the three metropolitan planning organizations and co-leads the Transit Village Task Force. It also works closely with NJ DOT and the New Jersey Department of Environmental Protection.

Transit Village Initiative[12]

- NJ DOT and NJ TRANSIT manage a multi-agency Transit Village initiative (it is co-led by NJ DOT). This program creates incentives for municipalities to redevelop or revitalize the areas around transit stations using TOD design standards.
- Municipalities that are committed to TOD may be eligible for Transit Village designation. The state has designated 35 transit villages. Benefits of designation include

more direct assistance from state agencies, priority funding, technical assistance, and grant eligibility.

Zoning

The Transit Village Initiative requires transit villages to use as-of-right zoning, rather than overlay zoning which can be subject to legal challenges. As-of-right zoning demonstrates a municipality's commitment to embrace transit-oriented development and developers benefit from knowing with certainty what they may and may not build.[13]

TOD Examples

Route 9 TOD Plan: NJ TRANSIT recently received an FTA grant to undertake a comprehensive TOD study along a 21-mile long corridor in central New Jersey. NJ TRANSIT identified 17 bus stops with TOD potential. The planners have reported that station areas are eligible for state and regional programs that incentivize affordable housing, and that TOD development can help municipalities meet their affordable housing requirement. Many New Jersey municipalities have required 15% to 30% affordable units in TOD projects, but some developers indicate the higher end of this range may not be feasible due to higher interest rates, construction costs, and land prices.[14]

Pennsauken Transit Center TOD Study: NJ TRANSIT received a grant from the DVRPC to help create a collective vision and strategies for TOD at a multi-modal transit center. This initiative includes outreach to start building support for TOD.[15]

Jersey City: The state's second largest city is located only a few minutes by train, bus and ferry from Manhattan. NJ TRANSIT's Hudson Bergen Light Rail line initially opened in 2000 and led to a residential building boom. By 2008, more than 10,000 housing units were either built or under construction at five station areas in Jersey City and adjacent communities. In 2021, the Jersey City Council adopted an inclusionary zoning ordinance that allows developers to increase their floor-area ratio as long as they include affordable units. The Bayfront Redevelopment Project in Jersey City (as shown in Figure N-1, is now converting a former brown field to a 100-acre housing development with a new park, school, fire station, and the extension of the light rail line. Bayfront will have 35 percent, or nearly 2,500 affordable apartments, when the project completes its final phase.[16]

Figure N-1. Visualization of Bayfront Development. (copyright permission pending)

Source: https://bayfront.us/master/

Cranford: In the late 1990s, Cranford in North Jersey was struggling to improve and rehabilitate its downtown. The town received a state Smart Growth grant to develop a downtown vision plan, and it was designated a Transit Village in 2002. Since then, mixed-used developments have been constructed near the train station including Cranford Crossing (shown in Figure N-2) with 50 units and retail, and Woodmont Station with 163 units. Riverfront at Cranford Station sits on a three-acre site with 106 housing units including 19 units with reduced rents, helping the town meet its state-mandated affordable housing requirements.[17]

Figure N-2. Cranford Crossing photo. Source: https://www.njtod.org/cranford-advances-riverfront-project/ (copyright permission pending)

Financial Tools

The "Transit Friendly Planning Guide" on pages 170 through 177 contains a list of funding sources that can help fund planning, designing and constructing TOD projects. The guide notes that funding can come from federal, state, and private entities.

NJ DOT has numerous funding programs including a Safe Streets to Transit program (to improve safety and accessibility near transit facilities), the Transit Village program, municipal aid programs, and metropolitan planning organization's programs.

Projects usually obtain funding from a variety of sources for distinct tasks along the project timeline.

Projects can receive funding that address specific physical and social conditions, such as remediation funding for a contaminated site and economic development funds to promote retail.

Other New Jersey programs include tax credits to carry out comprehensive revitalization plans, and incentivizing development through PILOT (payment in lieu of tax) agreements.

Key Lessons

<u>Promoting TOD</u>

NJ TRANSIT is an example of an agency that owns relatively few properties that are ripe for major TOD development, yet still takes a leading role in promoting TOD near its train stations and bus stops.

NJ TRANSIT's planners think that a visual preference survey and educating local officials can help overcome some of the resistance to higher density development.

Transit Agency Staff

NJ TRANSIT has planners with land use expertise who have the education and skills to work with communities, develop partnerships, and encourage land use decisions that promote TOD (such as reducing parking requirements). They also offer an important perspective about land use to other departments at a transit agency.

Transit agencies should make it easy for municipalities, organizations, and developers to contact their TOD offices. As noted by a team of researchers at the University of Utah, NJ TRANSIT is one of only a "handful of transit operators" in the U.S. that provides contact information for their TOD staff and divisions.[18]

NJ TRANSIT planners noted how it is important for a transit agency's TOD staff to break down silos within their agencies because TOD issues relate to departments focused on real estate, planning, government relations, stations, safety, bus operations, rail and light rail operations, NJTPD etc.

Land Use

To make TOD financially feasible for developers, higher densities than currently allowed may be needed.

Interagency Coordination

Transit agencies need to coordinate their work with numerous government agencies including state agencies.

State Policy

The state's requirement that all of New Jersey must provide their share of affordable housing is a powerful tool to encourage TOD with affordable housing.

The Transit Village Initiative is another important state program that encourages TOD.

Who We Interviewed

NJ TRANSIT Real Estate Department: Kristen Mitchell - Director, Transit Oriented Development

NJ TRANSIT Planning Department: Megan Massey - Director, Transit Friendly Planning

NJ TRANSIT Planning Department: Michael Swan - Principal Facilities Planner

Useful resources and innovative tools

NJ Transit noted that they have attended sessions about affordable housing at conferences hosted by the American Planning Association, Mpact Transit + Community, and NJ Future. Useful resources and innovative tools are referenced in table N-3 below.

Table N-3. NJ Transit useful resources and innovative tools

Resources	*Contents*	*URL*
NJ Transit's "Transit-Friendly Planning Guide"	Assist interested parties in making land use decisions around transit facilities that assist in improving mobility and access to transit.	https://transit-friendly-planning-njtransit.hub.arcgis.com/pages/guide
Transit Friendly Planning Newsletter	Informs people on what is happening in transit friendly planning (TFP) and transit oriented development (TOD) in the state and around the country: best practices, model programs, legislation, research, and local problem-solving experiences.	https://www.njtod.org
NJ Transit's "TOD Policy Statement"	Includes purpose, vision statement, goals, actions, and supporting policies of TOD.	https://content.njtransit.com/sites/default/files/tod/NJ%20TRANSIT%20Final%20TOD%20Policy%20Statement%20April%202024.pdf
NJ Transit TOD website	Provides information on NJ Transit TOD program and links to important information.	https://www.njtransit.com/tod
Request for Qualifications/Proposals for NJ Transit properties	Website that provides access to information regarding development opportunities.	www.njtransitdevelopment.com
Transit Friendly Data Application	Webpage that allows users to map out TOD planning and TOD elements including transportation.	https://transitfriendlydata.org/
The Transit Friendly Planning Newsletter	TOD-related weekly newsletter.	www.njtod.org

New Jersey Endnotes

Websites last accessed in October 2024 unless otherwise noted.

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[10] "New Jersey Statutes Annotated § 52:27D-304," *Justia Law*, https://law.justia.com/codes/new-jersey/title-52/section-52-27d-304.

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[13] Vivian Baker, "Transforming Transit Assets into Transit Villages", *InTransit*, Winter 2019.

[14] NJ Transit, "Route 9 TOD Plan," https://transit-friendly-planning-njtransit.hub.arcgis.com/pages/route-9-tod-home.

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Raleigh

Demographics

Raleigh is the capital and second largest city in North Carolina. It is also one of the fastest growing cities in the country. While the nation's population grew less than 50 percent between 1980 and 2020, Raleigh's population more than tripled during that time. Likewise, Raleigh's metropolitan area has been one of the fastest growing in the U.S.

North Carolina's Research Triangle includes three cities (Raleigh, Durham, and Chapel Hill) and their suburbs. It is home to major educational institutions (including the University of North Carolina at Chapel Hill, Duke University, and North Carolina State University) as well as numerous technology companies (e.g., Microsoft, IBM, Cisco Systems, and Accenture.)

This case study focuses on the city of Raleigh and its suburbs, and not the entire Research Triangle. Table R-1 provides demographic information for the city and metropolitan area of Raleigh.

Table R-1. Demographic Information for Raleigh metro area and city

	Population	*Population Change (2020-2023)*	*Size (sq miles)*	*Median Household Income (2022)*	*Travel mode to work (2022)*
Raleigh metro area[1]	1,484,338	Increase by 6.5%[2]	2,118	$92,739 (compared to $74,580 in the U.S.)	64 % drove alone 26% worked at home 7% carpooled Less than 1% took public transit (Compared to 3.1% in the U.S.)
City of Raleigh[3]	477,084	Increase by 3.6%[4]	148	$75,424	62% drove alone 25% worked at home 8% carpooled 1% public transit

Issues in Housing Affordability

According to the National Association of Realtors' Affordability Index, the Raleigh metropolitan ranks towards the middle of the case studies regarding the ability of a family earning the median income to qualify for a mortgage on a typical home.

Compared to the other case studies, Raleigh has a comparatively high number of affordable rental units per 100 households. However, the area still faces a housing affordability crisis. According to the National Low Income Housing Coalition, the Raleigh metropolitan area has a shortage of 18,385 available and affordable units at or below 50 percent area median income.[5]

For more information about these indices, see the Introduction to the Case Studies.

Transit Agency

Public transit for the city of Raleigh and its surrounding area is provided by GoRaleigh, previously known as Capital Area Transit, which was formed by the City of Raleigh in the mid-20th century as the public transit provider for Raleigh. In 2015, many of the transit agencies in the region were branded under the "Go" brand, with Capital Area Transit becoming GoRaleigh. Table R-2 provides information on the transit agency.

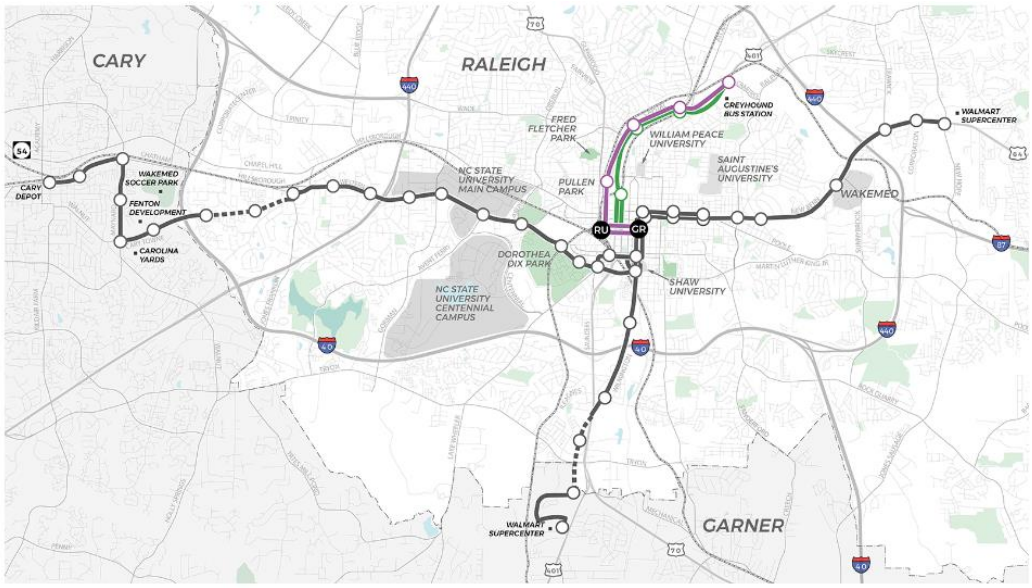
Table R-2. GoRaleigh Transit Agency Overview

Feature	*Number*
Number of Buses	116
Number of Trains	0
Bus Routes	39
Rail Lines	0
Bus Stations	1,300
Annual Ridership (2023)[6]	5,094,000

Equitable Transit-Oriented Development

The city of Raleigh is the county seat of Wake County. In November 2016, county voters approved a half cent sales tax increase to fund transit improvements including four BRT corridors.[7] The Northern, Southern, Western, and New Bern Avenue BRT lines will all radiate from Raleigh's city center, shown in Figure R-1. BRT service is expected to be fully available by 2035.

Figure R-1. Wake County BRT Corridor Map



Credit: City of Raleigh

GoRaleigh has taken the lead on planning the BRT routes while the city's Planning and Development department has taken the lead on station area planning efforts. Part of their planning process has included studying equitable development around transit stations, focusing on the community's priorities.[8] In 2020, the city published an Equitable Transit Oriented (ETOD) Guidebook which describes the city's development goals, TOD design principles, and station area types. It also contains a policy toolkit, which are the regulatory and policy tools available to implement equitable development near transit (particularly around the proposed BRT corridors serving the region.)[9]

The Guidebook describes how ETOD will help the city achieve all six of the goals it identified in its long-range plan: economic prosperity and equity, expanding housing choices, managing growth, coordinating land use and transportation, sustainable development, and growing successful neighborhoods and communities.[10]

Design Principles

In Table R-3, the city's six design principles for developing station area plans, along with some of the key strategies relating to the principles, are described.[11]

Table R-3. Raleigh's ETOD Design Principles and Strategies.

Design Principle	*Selected Key Strategies*
Encourage Mix of Uses	Allow mix of complementary uses, active ground floor use, proximity to transit.
Concentrate Density Around Transit	High density near BRT stations, require minimum building heights, have transitions to lower density areas.
Support Repurposing and Infill Development	Prioritize vacant and underutilized land for development (city owned or purchased) and repurpose existing places for mixed use.
Complete Streets for Better Transit	Improve bike and pedestrian infrastructure, connectivity to transit, and safety infrastructure.
Manage Parking Effectively	Eliminate parking requirements near BRT stations, conceal/integrate parking structures with development.
Create Engaging Public Spaces	Create public spaces that are safe, walkable, and connected to the community.

Station Area Types[12]

Table R-4 shows how the city has identified five different station area types. Raleigh is planning as many as 30 or more BRT stations along the BRT corridors. All of the planned BRT stations are assigned one or more of these types by their common characteristics.

Table R-4. Raleigh Station Area Types

Station Area Type	*Use*	*Building Height*
Downtown	Mixed use: retail, residential, office, civic, city, cultural uses.	Up to 40 stories or more.
Emerging Urban Center	Mixed use: retail, residential, office, civic, community services.	Up to 12 stories in the core of the station area. In larger centers, up to 20 stories.
Neighborhood Center	Residential uses, with local-serving retail and community services.	Up to 7 stories in the core station area, transitioning to 3 or 4 stories at the edge.
Campus	Regional employment centers, generally medical or institutional uses in a campus form.	Dependent on the needs of the institution.
Park	Parks near BRT stations, adjacent to residential areas.	Limited or no development at some stations.

Zoning Tools[13]

In 2021, the city of Raleigh updated the Transit Overlay District component of its zoning code (the Unified Development Ordinance) to allow for TOD with more affordable housing. The Transit Overlay District is applied mostly to the properties around the proposed BRT corridors that are already zoned for commercial and multi-family development. The TOD supports the level of density that is needed for BRT to have enough riders. It also makes sure that the public spaces around the transit stations are comfortable for people to walk.

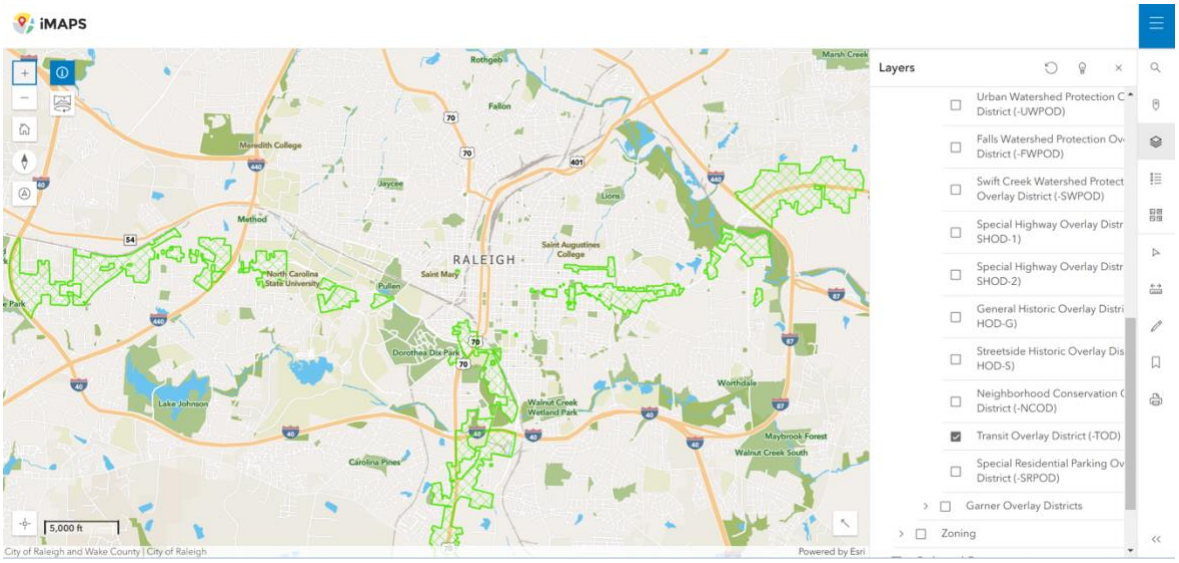
In the Transit Overlay District, a building can be 50% taller than the maximum height if it includes affordable housing units. The number of affordable units would have to be at least 20% of the bonus units in the building. The units must be affordable for a family making 60% of the area median income or less and stay affordable for at least 30 years.

No parking is required for any new development in any of Raleigh's zoning districts, including the Transit Overlay District.

Mapping Tool (iMAPS)

The City of Raleigh's iMAPS tool, shown in Figure R-2, is an interactive map that allows users to see information that includes a wide variety of geographical information including property boundaries, city parks, and transit overlay districts. The map is a useful tool for communities and developers to understand where these districts are located and their relationship to other land uses.

Figure R-2. Raleigh iMAPS tool



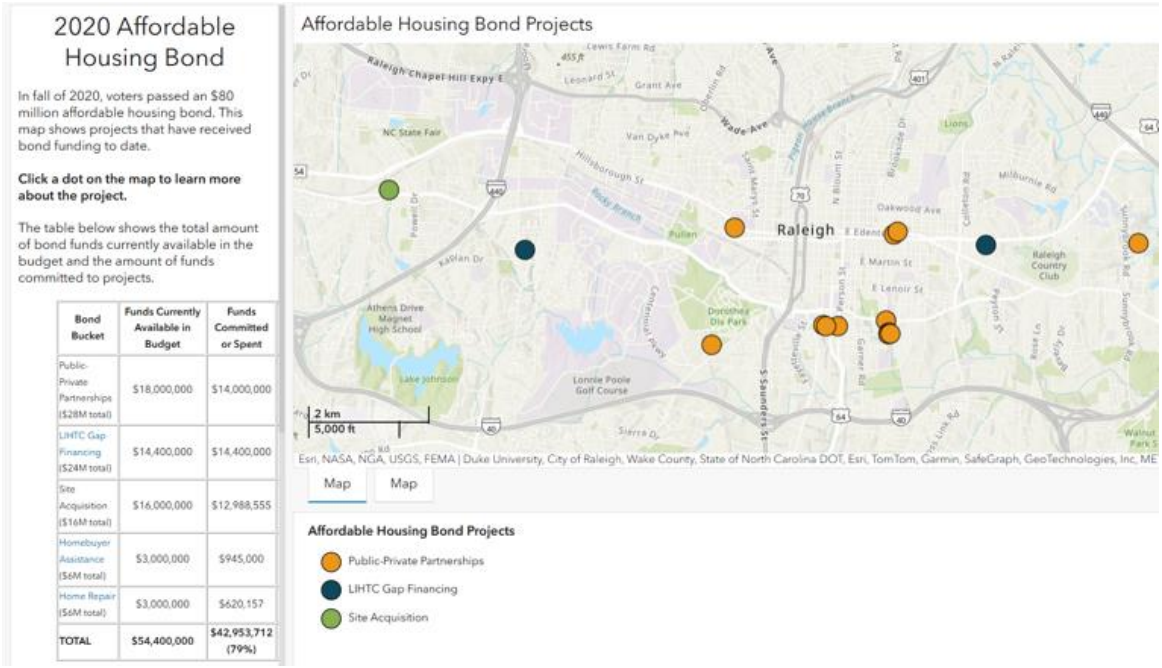
Credit: City of Raleigh

Financing Affordable Housing

In 2020, 72 percent of Raleigh voters supported a referendum to create an $80 million affordable housing bond program that funds homebuyer assistance, rental development, public-private partnerships, owner-occupied home repair, and TOD site acquisition/preservation.[14] The bond program is funded by a surcharge on residents' property tax bills.

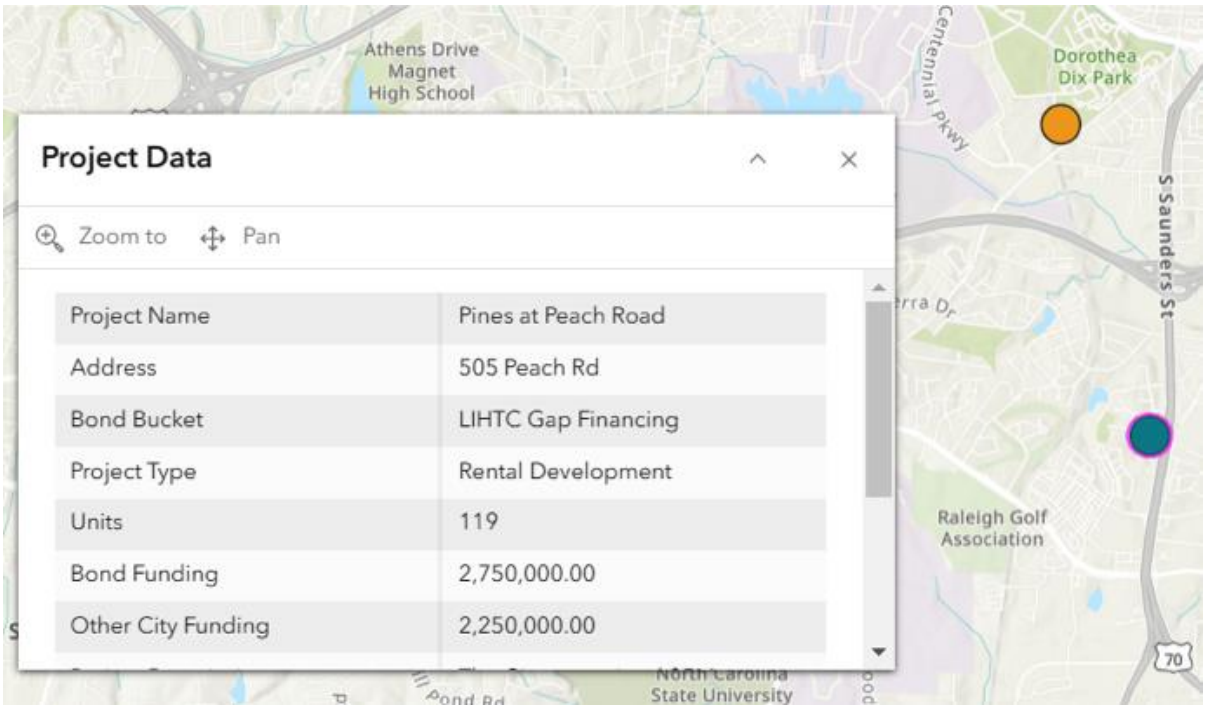
The Affordable Housing Bond Map, shown in Figure R-3, is an interactive tool which allows users to see housing developments that are financed by the Affordable Housing bond. The map shows the location of projects on the right side and a breakdown of funds available in the bond. Figure R-4 shows how the Map provides specific information for one project, including its name, address, number of units, and funding information. Users can click on points on the map, which then displays the project data included in Figure R-4.

Figure R-3. 2020 Affordable Housing Bond Map



Credit: City of Raleigh

Figure R-4. Data for One Project on the Affordable Housing Bond Map



Credit: City of Raleigh

Community Organizations

Raleigh has several community organizations area that are vocal on issues related to TOD and affordable housing. For example, Wake Up Wake County is active in promoting the benefits of TOD and affordable housing, and it provides the community with resources on city meetings, events, and open citizen positions on local committees/boards. Another advocacy organization, the Wake County Housing Justice Coalition, is vocal about the impact of gentrification and pushes the city to be more active in involving the public in planning and housing decisions.

Barriers to TOD and Affordable Housing

The city has faced some pushback to dense residential development in residential areas. Residents in the North Hills area opposed some housing construction because of the fear of new homes lowering property values of existing homes and opposition to townhomes being constructed around single family homes.[15]

Examples of TOD and Affordable Housing

<u>Milner Commons Apartments</u>

The Milner Commons Apartment complex provides affordable housing in a neighborhood east of downtown Raleigh. The 4.6-acre site includes 156 units with a mix of efficiency, one-bedroom,

and two-bedroom units. Monthly rents range from $875 to $1,200, and the sizes range from 408 to 986 square feet.[16]

All of the units are designed be affordable to seniors earning less than 60% of the area median income, 10% of the units are reserved for seniors with incomes of 30% of the area median income or less, and another 10% are reserved for persons with disabilities or formerly homeless transitioning to permanent housing.[17]

The City of Raleigh committed $5.9 million for the development, which is located along the planned New Bern Avenue BRT route.[18] The project also received a $1 million dollar loan from Brightspire, a nonprofit affiliated with the church that owns the land.[19]

Pines at Peach Road

Currently under construction, The Pines at Peach Road is an affordable apartment complex consisting of 119 units along the planned Southern BRT route. The apartments will include one-, two- and three-bedroom units across five buildings.[20]

The City of Raleigh committed $5 million, including $2.25 million in funds from the affordable housing bond program.[21] The project is financed with Low Income Housing Tax Credits from the North Carolina Housing Finance Agency, tax exempt bonds issued by the Raleigh Housing Authority, debt financing from Redstone Federal Credit Union, tax credit equity from Aegon (an investment and asset management company), and gap financing from the City of Raleigh.[22]

Key Lessons

Integration of land use and transit: The relationship between land use and transit is very strong in Raleigh since GoRaleigh (the transit provider) is a unit of the city's transportation department. This makes it easier to design and implement BRT and TOD since one entity controls zoning, roadway design, and transit services.

Overcoming inclusionary zoning mandate: North Carolina state law does not allow for inclusionary zoning, so cities cannot mandate that developers include affordable housing. However, the city has gotten around this barrier by incentivizing density bonuses for affordable housing construction.

Understanding the real estate market. Before adopting the density bonuses for affordable housing, the city's planning department conducted a study to determine the optimal incentives.

An important component of their research was talking to local developers, so that the planners would better understand construction costs and the demand for different types of housing.

Growing in a transit friendly manner: Because of the coordinated ETOD and BRT planning and policies -- the city is positioned to grow around its future BRT lines in an equitable manner that tries to minimize displacement and gentrification.

Planning informed by community: City staff noted that an important lesson for other cities is to make TOD decisions that are informed by the community. For example, based on community feedback, the city adopted policies that encourage affordable housing units designed to serve very low-income households.

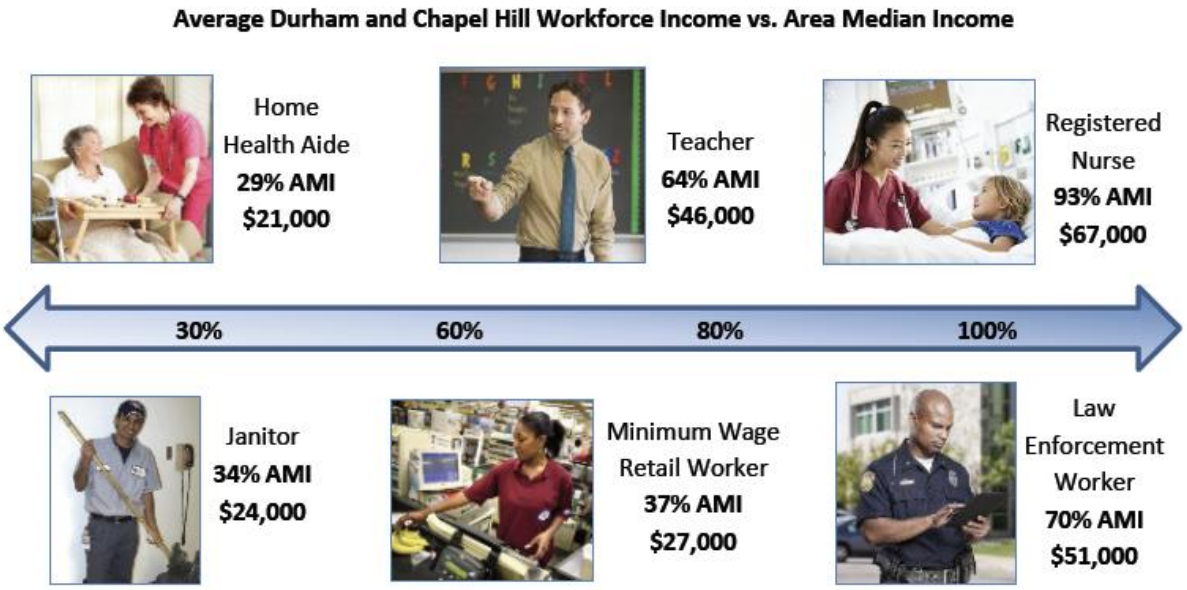
Hands-on community engagement activities: In October 2019, the city hosted a workshop that included an interactive activity. As shown in Figure R-7, participants were given Lego bricks and a map of the city, and were then asked to place bricks in places they thought would make sense to accommodate growth. The participants chose to put them along BRT corridors. The workshop provided a chance for the city and community to discuss the benefits of TOD.[23]

Figure R-7. Lego block exercise. Source: ETOD Guidebook (copyright permission pending)

Agency coordination: Staff noted that extensive coordination is important and must involve the city's housing, community engagement, engineering, planning, and transportation offices working together.

Identifying with those who need affordable housing: Transit officials in the Raleigh area have prepared materials about affordable housing that have resonated with the public, helped people visualize who would benefit from new policies, made the need for affordable housing more relatable, and highlighted the real-life impacts of housing affordability. For example, Figure R-8 (prepared for a proposed regional light rail line in 2018[24]) shows how the income of six different households compares to the area median income (assuming the worker is a solo earner in a three-person household).

Figure R-8. Median Income for Regional Workers (Copyright permission pending)



Who We Talked To

Hannah Reckhow—Planning Supervisor, City of Raleigh

Useful Resources and Innovative Tools

Table R-4. Raleigh useful resources and innovative tools

Resource	*Content*	*URL*
ETOD Guidebook	ETOD Vision, TOD design principles, station area types, zoning tools, affordable housing and financing information.	https://cityofraleigh0drupal.blob.core.usgovcloudapi.net/drupal-prod/COR22/EDATGuidebook.pdf

ETOD iMAPS tool	Interactive map that allows users to see where transit overlay districts are located.	https://maps.raleighnc.gov/iMAPS/index.html
City of Raleigh Comprehensive Plan White Paper	Summary of the 2030 Comprehensive Plan, which outlines the long-range planning goals for the city.	https://cityofraleigh0drupal.blob.core.usgovcloudapi.net/drupal-prod/COR22/CPUWhitePaper.pdf
Transit Overlay District webpage	Provides important information and components of transit overlay districts.	https://raleighnc.gov/planning/services/text-changes/what-transit-overlay-district
City of Raleigh Affordable Housing Annual Report	Annual FY22-23 affordable housing report: updates on affordable housing goal progress and information on funding for affordable housing.	https://cityofraleigh0drupal.blob.core.usgovcloudapi.net/drupal-prod/COR19/HN-Affordable_Housing_Annual_Report__FY23-R4.pdf
Affordable Housing Bond Spending Plan	Detailed background on the Affordable Housing Bond.	https://raleighnc.gov/housing/services/affordable-rental-housing/affordable-housing-bond-spending-plan
Affordable Housing Bond Projects Map	Interactive map that shows projects which have receiving bond funding.	https://ral.maps.arcgis.com/apps/dashboards/5e850f4e17c8462298d95ae198fdf2c4
BRT Project webpage	Detailed information on each of the four BRT corridors.	https://raleighnc.gov/bus-rapid-transit

Raleigh Endnotes

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Salt Lake City

Demographics

Salt Lake City, the capital and largest city in Utah, is experiencing an economic development boom, with its downtown witnessing the construction of new hotels, office spaces, and mixed-use developments. The Salt Lake City metropolitan area is situated on the Wasatch Front, a region defined by the cities along the western side of the Wasatch Mountains. Table SL-1 provides demographic information about Salt Lake City, the city of Murray (located less than ten miles from Salt Lake City), and the metropolitan area.[1]

Table SL-1. Demographic Information for Salt Lake City Region and city

	Population (2022)	*Population Change (2020-2023)*	*Size (sq miles)*	*Median Household Income (2022)*	*Travel Mode to Work (2022)*
Salt Lake City-Provo-Orem metro area[2]	1,266,191	Increase by 0.6%[3]	7,684	$91,891 (compared to $74,580 in the U.S.)	66% drove alone 19% worked at home 11% carpooled 2% public transit (compared to 3.1% in the U.S.)
City of Salt Lake City[4]	204,653	Increase by 4.5%[5]	110.9	$75,529	60% drove alone 20% worked at home 9% carpooled 3% public transit
City of Murray[6]	50,041	Decrease by 1.9%[7]	12.3	$81,693	69% drove alone 18% worked at home 8% carpooled 3% public transit

Issues in Housing Affordability

The median home price in the city of Salt Lake City is $545,000, which is 27 percent higher than the national median of $428,281.[8] The National Association of Realtors affordability index measures whether or not a typical family could qualify for a mortgage on a typical home. Of the

12 areas compared in the case studies, the Salt Lake City metropolitan area is the fifth hardest place for a family to qualify for a mortgage.

The National Low Income Housing Coalition affordability index estimates the number of affordable and available rental housing units per 100 households at or below certain area median income thresholds. Since the index that includes affordability for major metropolitan areas does not include data for Salt Lake City, the case study comparison instead uses information for the entire state of Utah. Statewide, there are 57 affordable and available rental units per 100 households, which places it in the middle of the case study areas. The statewide measure is relevant because almost 37 percent of the state population lives in the Salt Lake City metro area.[9]

For more information about these indices, see the Introduction to the Case Studies.

Transit Agency

The Utah Transit Authority (UTA) is the public transit provider for the Salt Lake City region. UTA was founded in 1970 after residents of Salt Lake City and its surrounding cities voted to form a public transit district. UTA provides bus service, express bus, light rail line, and streetcar.[10]

The agency has one of the largest coverage areas in the country, at around 1,40o square miles.[11] Table SL-2 provides general information about UTA.

Table SL-2. Utah Transit Authority Agency Overview

Feature[12]	*Number*
Number of Buses	713
Number of Trains	114 light rail vehicles, 52 passenger rail cars, 18 locomotives, 3 streetcars
Bus Routes	96
Rail Lines	3 light rail lines, one commuter rail line, one streetcar line
Rail Stations	50 light rail stations, 15 commuter rail stations, 7 streetcar stations
Annual Ridership (2023)[13]	35 million

UTA's Transit Oriented Development Program

In 2014, UTA broke ground on its first joint venture transit-oriented developments. It also published a set of TOD Design Guidelines for developing TOD sites with private partners. The Guidelines include design elements that UTA expects developers to consider and address in their development plans.

UTA's has three major goals for its TOD program:[14]

- Increase ridership by promoting mixed use and transit-centered development.
- Support strategy of accommodating 33 percent of the region's future development on just 3 percent of available land.
- Generate revenue from joint development.

As of May 2024, 13 TOD projects have been completed or are under construction with 1,720 dwelling units (126 of which are affordable), 570,000 square feet of office space, 192 hotel rooms, and 50,000 square feet of retail / commercial use. UTA has calculated that the TOD projects have involved a private investment of $469 million and a UTA capital investment of $44.3 million.

The agency still owns more than 2,200 total acres of land near it transit system, of which approximately 100 have been categorized for future TOD use.[15]

UTA uses the term "transit-oriented communities" to expand the perception of traditional TOD away from any one single development. The focus of TOC is to establish development centers and integrate transit into the community.[16]

UTA's approach to density is based on four different types of TOD areas as defined by the Wasatch Front Regional Council (an association of governments that serves as the region's MPO.) Its long-range plan is known as the Wasatch Choice Vision. Table SL-3 shows the MPO's approximate densities for each center type.[17]

Table SL-3. Densities of the TOD Development Types

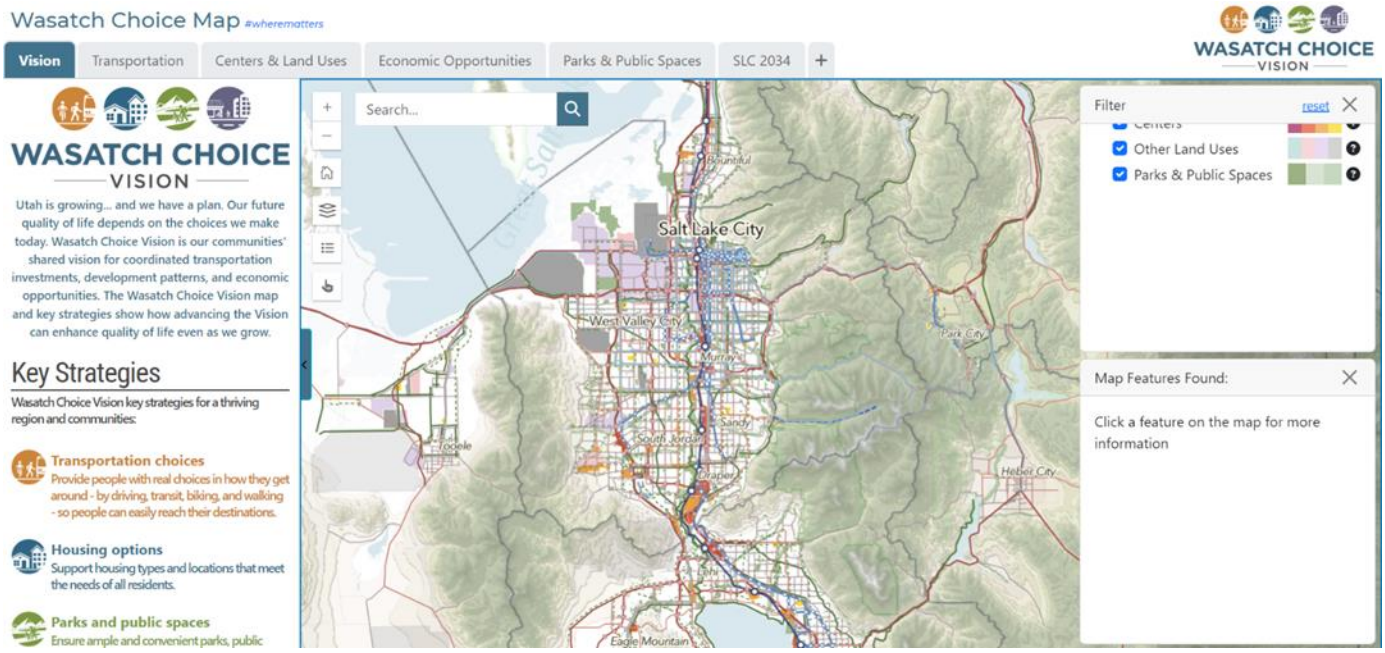
Wasatch Choice Vision Center type	*Minimum Residential Units Per Acre (dwelling unit per acre)*
Metropolitan Center	20 to 200
Urban Center	20 to 100
City Center	10 to 50
Neighborhood Center	6 to 25

TOD Tool: Wasatch Choice Map

With the MPO's Wasatch Choice Map, users can examine transportation elements, land use types, economic opportunities, and major regional projects across the Salt Lake City region. The

map, as shown in Figure SL-1, can be used by officials, developers, and the general public to visualize existing conditions and potential areas for TOD projects.[18]

Figure SL-1. Wasatch Choice Vision Mapping Tool



Credit: WFRC

Parking Ratios

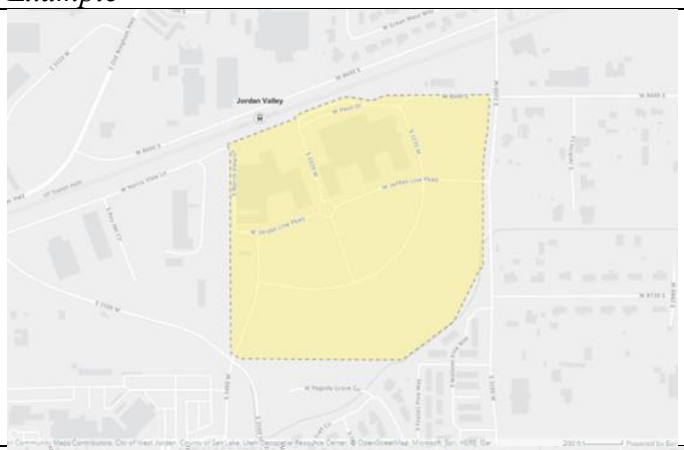
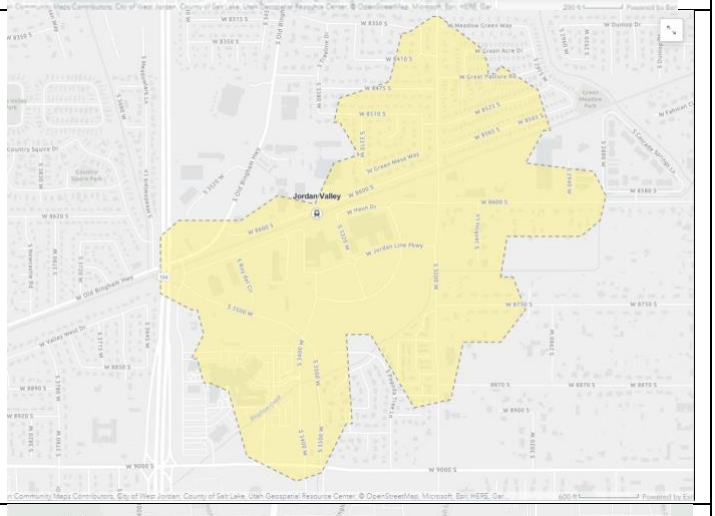
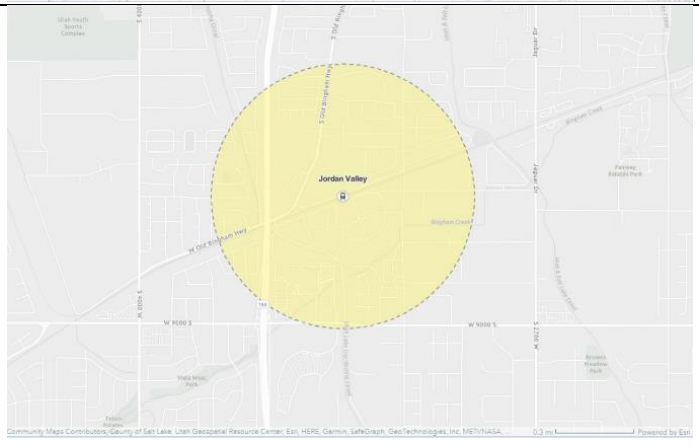
The agency has grappled with right-sizing parking facilities at its TOD development sites. It recognizes that potential residents may be less attracted to developments with few parking spaces, since outside of downtown Salt Lake, driving to a station and parking is a common method of commuting. However, too much parking takes up developable land and may get in the way of walkability and connectivity. Currently, Salt Lake City has parking requirements city-wide, except for in transit contexts (zoning districts that immediately surround mass-transit facilities and/or are in the downtown core), where there is no minimum parking requirement.[19] The City of Murray has not eliminated parking minimums.

Station Area Planning

UTA collaborates with communities to perform Station Area Plans which identify how properties will be used, based on stakeholder feedback, assessment of existing conditions, and any plans from the respective cities.[20] As shown in Table SL-4, station areas are comprised of three elements: development area, catchment areas, potential catchment areas.[21]

Station area plans are reviewed by local municipality and UTA's Board of Trustees. UTA's TOD team then pursues development of sites approved by the Board by working alongside UTA's publicly procured development partners, local elected officials and staff, as well as other UTA departments to plan, design, finance, construct, and manage TOD projects.

Table SL-4. UTA Station Area Types

Station Area	*Description*	*Example*[22]
Development Area	Properties likely to be part of the new TOD effort. Property owners play a critical role in station area planning process, helping define residential, commercial, retail, and open space uses.	
Catchment Area	The furthest distance a typical pedestrian can easily walk to the station platform in 10 minutes.	
Potential Catchment Area	Ideal 10-minute walk radius extending equally from the station. Understanding the gap between this ideal area and the actual catchment area helps prioritize infrastructure improvements.	

Joint Development

UTA partners with local governments, regional planning organizations, real estate developers, property owners, and the public to plan, design, and implement developments around transit stations.

In most cases, UTA's properties are immediately adjacent to station platforms. UTA works with all interested parties around a station to create a vision for new development and an implementation plan to fulfill that vision. If UTA's properties are involved, a joint development partnership may be formed between UTA and private development interests to develop these parcels.[23]

UTA's criteria for selecting joint venture projects include:

- developer and tenant interest
- TOD potential
- availability of funding sources (federal, local, and private)
- level of city's interest and willingness to adapt zoning and use plans to accommodate appropriate development types and densities
- geographic distribution within the region
- potential to increased ridership.[24]

Housing and Transit Reinvestment Zones

In 2021, the Utah State legislature passed a law that allows cities and counties to establish Housing and Transit Reinvestment Zones. These zones allow a portion of tax revenue growth around a transit station to be used for development costs including housing costs, construction, parking development, and land purchases.[25] The Reinvestment Zones are intended to address Utah's housing crisis by promoting mixed-use, multi-family, and affordable housing near transit hubs.

The Reinvestment Zones program includes the following requirements:[26]

- At least 12 percent of the residential units must be affordable, including at least three percent reserved for households with a gross income no more than 60 percent of the area median income.
- Residential use on at least 51 percent of developable acreage.
- An average of at least 50 residential units per acre dedicated to residential use at commuter rail and light rail stations. This requirement is at least 39 dwelling units per acre at BRT stations.

- Each county can have no more than eight zones around light rail stations and three around BRT stations.

Zoning in Salt Lake City and Murray

Salt Lake City

In its zoning code, the City of Salt Lake City has established TOD related core and transition areas.[27]

Core areas feature comparatively intense land development with a mix of land uses, generally within a one-quarter mile walk of a transit station platform. The core area may mix ground floor retail, office, commercial and residential space. Buildings should be a minimum of two or three stories in height, depending on location. A minimum of 30 dwelling units per acre is encouraged within the core.

Transition areas reinforce the viability of the core area and provide opportunities for a range of housing types at different densities. Transition areas are generally located within a one-half mile from the station platform but may vary based on the character of the area. The minimum desired density is 10 dwelling units per acre. Commercial uses may include office, retail, restaurant and other commercial land uses that are necessary to create mixed use neighborhoods.

Murray

The city of Murray has three light rail stations that opened in the 1990s and a commuter rail station that opened in 2012. In 2010, the city adopted a mixed-use development district to encourage the development and redevelopment of Murray's core areas into live/work neighborhoods. This area emphasizes pedestrian-oriented design by providing amenities such as public open spaces, pedestrian walkways, wide sidewalks, bike lanes, attractive streetscapes and transit opportunities.[28]

In February 2021, Murray instituted a temporary moratorium on new development applications, so that it could review its existing zoning ordinances to address concerns about parking, densities, commercial requirements, and design considerations. Five months later, it modified its zoning ordinance to further encourage TOD, including creating a zone that allows additional residential density which can be increased if a developer provides affordable housing, mixed housing types, additional commercial space, or project amenities.[29]

Barriers to TOD and Affordable Housing[30]

While there is community support in the Salt Lake City area for TOD, UTA staff noted that the presence of NIMBY (not-in-my-backyard) voices both in the community and local governments. Furthermore, adopting zoning changes and implementing TOD tends to be more challenging and

slower in some communities, where local officials and community members have been less eager to collaborate on UTA's TOD efforts and invest in infrastructure that supports TOD.

Example of TOD and Affordable Housing

The Hub of Opportunity housing development is a 156-housing unit complex, located near the 3900 South Meadowbrook light rail station, located in South Salt Lake (a city south of Salt Lake City). The complex offers both affordable housing and market-rate housing, with 110 of the 156 housing units designated as affordable.[31] The development combines community services, employment opportunities, and community living for individuals with disabilities

The project is a public-private partnership between Housing Connect (the housing authority for Salt Lake County) and Columbus Community Center (a disabilities advocacy organization.). On separate occasions, UTA issued RFPs for development at the 3900 South Meadowbrook lot, but proposed developments did not move forward. The housing authority for Salt Lake County and the Columbus Center proposed their plan for a development, which ended up going through. UTA owned the land adjacent to the park-and-ride lot at the 3900 South Meadowbrook station and leased 2.8 acres of the property to Housing Connect and Columbus Community Center for its development.[32]

The total cost of the project was $46 million, with the project cost covered by tax credits, bonds, private, state and county funding.[33] Salt Lake County provided $900,000 and the state of Utah's Olene Walker Housing Loan Fund contributed $980,000.

The project was one of the first UTA TOD projects to be developed in an Opportunity Zone (a federal program that designates areas created to incentivize private investment in economically distressed communities) and the first project by Housing Connect financed through low-income housing tax credits.

Key Lessons

Station Area Planning: UTA staff noted the importance of creating a holistic station area plan that considers all of the aspects of TOD including parking, streetscapes, community needs, and transit connectivity. For example, the Murray North Station area plan lays out in detail the existing conditions around the station, and planned land uses (including future commercial, office, residential, and connectivity plans). The plan incorporates the community's desire to enhance connectivity, improve access to goods and services, and create a positive image for the neighborhood. The plan also identifies the specific elements that will achieve these goals.[34]

Building relationships: UTA builds strong relationships with its partners. For example, coordinating its TOD guidelines with the MPO's long range plan, and preparing station area plans with cities, counties, and developers.

Changing the narrative: UTA's TOD program and the state's Housing and Transit Reinvestment Zone are helping to change the perception about where and how Salt Lake will grow.

Who We Talked To

Paul Drake—Director of Real Estate and Transit Oriented Development, Utah Transit Authority
Zachary Smallwood—Planning Division Manager, City of Murray, Utah

Useful Resources and Innovative Tools

Table SL-5. UTA TOD Useful Resources and Innovative Tools

Resource	*Contents*	*URL*
UTA TOD Design Guidelines	2014 Guidelines that provide the goals and design elements of UTA's TOD program.	https://www.wfrc.org/new_wfrc/programs/LocalPlanningResourceProgram/TODGuidelines.pdf
UTA Transit-Oriented Communities information	Priorities, station area, and properties.	https://legacy.rideuta.com/Doing-Business/Transit-Oriented-Communities
UTA Station Area Planning: Standing Operating Procedures	Purpose, scale, scope, roles and responsibilities associated with station area planning.	https://www.rideuta.com/-/media/Files/Test-Pages/Station-Area-Plans/SAP_Overview2023.pdf
Wasatch Choice Map	Wasatch Front Regional Council's tool to visualize TOD elements such as housing, economic development, and transportation.	https://wasatchchoice.org/vision-map/
Housing and Transit Reinvestment Zone White Paper	Objectives, requirements, and processes relating to the Reinvestment Zones.	https://wfrc.org/PublicInvolvement/GovernmentalAffairs/HTRZWhitePaper.pdf
Murray North Station Area Plan	Example of a station area plan.	https://www.murray.utah.gov/DocumentCenter/View/15922/Murray-North-Station-Area-Plan
Wasatch Choice Vision	MPO's long range plan.	https://wasatchchoice.org/

Salt Lake City Endnotes

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Seattle

Demographics

Located in King County along the Puget Sound, Seattle is the largest city in the state of Washington. It is known for its thriving technology industry and is home to notable companies including Microsoft, Amazon, and Boeing. The city's population grew over 30 percent between 2000 and 2020, compared to 18 percent for the U.S. as a whole. The city's population has continued to grow.

The following table, Table ST-1, provides census information about the city and its metropolitan area. Unlike most of the other case study metropolitan areas, the city is growing faster than the region as a whole, and household income is higher in the city than its outlying areas.

Table ST-1. Demographics of Seattle and the metropolitan area

	Population (2022)	*Population Change (2020-2023)*	*Size (sq. miles)*	*Median Household Income (2022)*	*Travel Mode to Work (2022)*
Seattle-Tacoma-Bellevue metro area[218]	4,034,248	Increase by 0.4%[219]	5,870	$106,909 (compared to $74,580 in the U.S.)	57% drove alone 25% worked at home 3% walked 5% public transit (compared to 3.1% for public transit in the U.S.)
City of Seattle[220]	749,267	Increase by 1.9%[221]	84	$115,409	37% drove alone 36% worked at home 7% walked 12% public transit

Issues in Housing Affordability

Seattle is grappling with a severe housing crisis, marked by skyrocketing home prices and rent hikes. Among more than 350 metropolitan areas, Seattle has the sixth highest residential rents (based on data from the U.S. Census Bureau and U.S. Department of Housing and Urban Development.)[222] Likewise, the median sales price of an existing single-family home in 2023 was $735,000 in the metropolitan area, compared to $394,100 in the U.S.[223]

There are only 39 affordable and available rental units per 100 households at or below 50 percent of the area median income, according to the National Low Income Housing Coalition. This is the lowest number among all the case studies.

Compared to the other case studies, the typical family in the Seattle area is much less likely to earn enough income to qualify for a mortgage on a typical home, per the National Association of Realtors' Housing Affordability Index. Only residents in the Bay Area are less likely to qualify.

For more information about these indices, see the Introduction to the Case Studies.

Transit Agency: Sound Transit

Sound Transit is officially known as the Central Puget Sound Regional Transit Authority. It was created in 1993 as a joint effort of three counties (Snohomish, King, and Pierce). In 1996, voters within the Sound Transit district authorized a tax to fund the agency's first express bus, commuter rail and light rail projects.

The three counties also operate their own local transit services. For example, King County operates one of the nation's largest bus systems with approximately 250,000 average weekday boardings.[224] The following table, Table ST-2, provides general information about Sound Transit.

Table ST-2. Sound Transit Agency Information

Feature	*Number*
Number of Buses	303
Number of Trains/ Light rail vehicles	222 light rail vehicles and 67 heavy rail cars
Bus Routes	27
Rail Lines	2 light rail and 2 commuter rail
Rail Stations	39 light rail and 12 commuter rail
Annual Ridership (2023)	37.5 million[225]

In 2000 the agency opened its first commuter rail line between Tacoma and Seattle and its first light rail line began operation in 2003.

The region's voters approved ballot measures in 2008 and 2016 to expand Sound Transit's network. As the agency undertook one of the nation's most ambitious transit expansion plans, it needed to purchase land for construction and operations. Much of the land would be used as staging areas to store rail, trucks, utilities, and concrete barriers, and to stockpile materials for hauling to work zones. For example, approximately six acres of land in the city of Federal Way, Washington are currently being used for equipment storage and staging during construction of light rail.

Sound Transit does not need many of its staging areas after completing construction projects. Policy makers realized the disposition of such properties would be an opportunity to promote affordable housing. In 2015, as part of state authorization for the third phase of Sound Transit's construction, the state legislature mandated that the agency prioritize affordable housing when it sold any surplus land. Before this 2015 state law, the agency sold its surplus land for fair market value.[226]

TOD

During the 1990s, Sound Transit began to promote TOD and affordable housing, and in 2012, it adopted its first TOD policy, followed by an update in 2014. Triggered by the 2015 state law, Sound Transit adopted an Equitable TOD Policy in 2018 that that aimed to implement equitable TOD during the planning, design, construction, and operation of the system.[227]

ETOD Policy's Key Features

Before adopting its 2018 ETOD policy, Sound Transit received input from the Housing Development Consortium, Puget Sound Sage, Futurewise, and other transportation and housing advocacy organizations who encouraged the inclusion of strong affordable housing elements.[228]

The ETOD policy's key features include:[229]

- Support affordable housing development (including cross-subsidy and transfer of development rights to generate revenue for affordable housing initiatives.)
- Inclusive planning and decision-making
- Integration of land use planning with transit infrastructure, considering local comprehensive plans and the feasibility of redevelopment.

- Create mixed-use neighborhoods that provide a range of housing types and commercial spaces, and promote local economic development

Roles and Responsibilities[230]

Sound Transit's Community Development Office has a staff of 9 people who take the lead on TOD-related projects. Within this office, the transit-oriented development team focuses on properties adjacent to Sound Transit's stops and stations, preparing and offering those sites for development, aligning resources for affordable housing creation, as well as acting as subject matter experts on policy efforts that can help deliver TOD and affordable housing projects (e.g., reducing parking minimums). The team focuses on integrated joint development and air rights development over Sound Transit's properties.

Two State Policies that Promote ETOD

In 2015 the state legislature adopted RCW 81.112.350 which included the following two TOD components.

<u>80/80/80 policy</u>
The state law required Sound Transit to offer at least 80 percent of its surplus property suitable for housing, first, towards the creation of housing that is affordable for families making 80 percent or less of the area median income.[231]

Sound Transit's ETOD policy, derived from the state statute, indicates that subject to certain exemptions:

- A minimum of 80 percent of surplus property (suitable for development as housing), must be first offered to qualified entities that agree to develop affordable housing, consistent with local land use and zoning laws. Qualified entities include local governments, housing authorities, and nonprofit developers.
- At least 80 percent of the housing units constructed on development sites must be affordable.
- Affordable housing units must serve those earning no more than 80 percent of the area median income.

Hence the name, the 80/80/80 policy.

<u>Revolving Loan Fund</u>

The state law required Sound Transit to contribute $4 million annually for five years to a revolving loan fund in support of affordable housing related to TOD. Sound Transit plans to contribute $20 million to the Washington State Housing Finance Commission' Land Acquisition Program that helps developers purchase land for development of affordable housing. Developers can purchase land at favorable interest rates as it becomes available on the market, and then take the necessary time to assemble financing for construction.[232]

TOD Program Accomplishments[233]

State law requires Sound Transit to provide quarterly updates on its ETOD implementation. Through June 2024:

- 3,473 homes have been built or are in the process, of which 2,673 (77 percent) are deemed affordable. (Note that the 77 percent includes projects that pre-dated the passage of the 80/80/80 state statute).
- Public and private investments for TOD projects have totaled $1.7 billion.
- 14 stations have either completed or planned TOD projects.

Example of TOD and Affordable Housing[234]

Cedar Crossing is an apartment development project adjacent to the Roosevelt light rail station, north of downtown Seattle. Sound Transit issued an RFP for the 54,000 square foot property after it was no longer used for light rail construction staging.

The apartments opened in 2022 with 254 housing units, all of which are affordable to households earning up to 60 percent of the area median income. The development has fewer than 75 parking stalls and room for more than 254 bicycles.

The apartments, pictured in Figure ST-1, include 14,000 square feet of retail space.[235] They were developed by Bellwether Housing (the region's largest nonprofit affordable housing provider) and Mercy Housing Northwest (a division of a national nonprofit organization that helps preserve, manage, and finance affordable housing).

Sound Transit offered the property at a discounted price. In addition, the Seattle's Office of Housing contributed $15 million, King County provided funding, and the developers worked with a state agency to obtain Low Income Housing Tax Credit credits.

Figure ST-1. Image of Cedar Crossing affordable housing development project. Source: Sound Transit.

Credit: Sound Transit

Key Lessons[236]

Board Structure: The transit agency's board is made up of 17 elected officials and the state's Secretary of Transportation. The direct involvement of elected officials might make the agency more sensitive to the region's housing crisis, and more willing to make the development of new affordable homes an agency priority.

Considering community benefits: When Sound Transit issues an RFP it does not just evaluate proposals based on the number of affordable units that will be built. Prior to issuing RFPs, agency staff engage with the community to learn about local needs and desires. Proposals are judged, in part, by the benefits that are provided such as provisions for ground floor commercial and community-serving space, units that accommodate families, green building certifications, contributions to passenger experience, and bicycle parking.

Discounting Land: Sound Transit's policy of selling land for $250,000 or $1,000 per housing unit (whichever is less) is an important tool in making affordable housing projects financially viable.

Equitable TOD policy: The board's adoption of an ETOD policy established clear priorities and guidelines for the agency staff to follow.

Experience with affordable housing: Sound Transit has developed experience and relationships by working with state and local government agencies, and affordable housing developers, which has helped deliver ambitious affordable housing projects.

Partnerships: As noted in the Cedar Crossing project, multiple sources of financial assistance are needed to build TOD with affordable housing, such as discounting the price of transit agency land, securing city funds, and tapping into tax credits. Sound Transit has partnered with public and private funders to pre-commit resources to projects on its property.

Paying for Infrastructure: Some cities make developers responsible for infrastructure work (e.g., water, sidewalk, sewers) needed to support new development. That can be a costly expense for affordable housing developers. The State of Washington's Connecting Housing to Infrastructure program helps make affordable housing projects more viable by covering upfront infrastructure costs and connecting housing to municipal systems (such as water and sewer.)

Reducing Uncertainty: Sound Transit tries to clearly articulate and prioritize its goals so that proposers of projects are not guessing the agency's preferences. It also tries to be clear about challenges; for instance, the agency aims to set realistic expectations about timelines, an important consideration since TOD projects take many years to complete. Likewise, Sound Transit has found that developers can submit better proposals when they have more information. As noted above, for most projects, Sound Transit now tells developers that the cost of land will be $250,000 or $1,000 per housing unit whichever is less. Previously, RFPs asked proposers to demonstrate why they needed to purchase land at a discount.

Retail Issues: While many communities want developers to incorporate retail into their projects, retail space can be a loss leader for multifamily developments, including affordable housing. Sound Transit has been encouraging some developers to build space for small businesses and provide other kinds of commercial spaces such as medical offices.

State requirements: The 80/80/80 policy and Sound Transit's contribution to a revolving loan fund program have helped deliver affordable housing projects. Both are the result of state mandates but are coupled with an agency commitment to realizing affordable housing outcomes.

Strategic Purchasing of Land: Sound Transit cannot acquire property for TOD, but it does consider the potential for TOD when it sites light rail stations and selects properties for construction staging.

Dedicated Staff: Having nine staff members dedicated to TOD projects, and identifying the roles that relevant departments must perform, has helped Sound Transit deliver TOD projects.

Who We Talked To

Sound Transit staff.

Useful Resources and Innovative Tools

The following table, Table ST-3, identifies useful resources and tools prepared by Sound Transit including its TOD plans, policy for disposing surplus property, quarterly reports, and lessons learned.

Table ST-3. Sound Transit Useful Resources and Tools Chart

Resources	*Contents*	*URL*
Sound Transit TOD 2014 Strategic Plan	TOD policy goals, strategic priorities, information on joint development, partnerships, and real property surplus.	https://www.soundtransit.org/sites/default/files/20140423_RPT_TOD.pdf
Sound Transit 2018 ETOD Plan	Overview of the agency's ETOD plan, including the 80/80/80 policy. Builds on the 2014 strategic plan, by providing the elements of equitable TOD into Sound Transit's TOD program.	https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2018/Resolution%20R2018-10.pdf
Real Property Excess, Surplus, and Disposition Policy	Provides guidance on surplus Sound Transit property (property ST no longer needs and can use for development).	https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2013/Resolution%20R2013-30.pdf
Revolving Loan Fund	Provides information on the revolving loan fund.	https://www.soundtransit.org/sites/default/files/documents/revolving-fund-needs-assessment-short-20200616.pdf
TOD Quarterly Reports	Provide updates on TOD program.	https://www.soundtransit.org/sites/default/files/documents/sound-transit-tod-quarterly-report-Q2-2024.pdf
Sound Transit TOD presentation to the Seattle Design Commission	Includes key lessons learned from Sound Transit's TOD Program.	https://www.seattle.gov/documents/Departments/OPCD/DesignCommission/LightRailReviewPanel/WestSeattleStations/2023.12.07%20SDC%20presentation%20re%20TOD.pdf
Washington State 81.112.350 law	Legislation regarding revolving loan fund and 80% surplus property requirement.	https://app.leg.wa.gov/rcw/default.aspx?cite=81.112.350

Seattle Endnotes

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