Optimizing Land Uses at Transit Stations

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BAY AREA COUNCIL ECONOMIC INSTITUTE

EXECUTIVE SUMMARY

This brief draws on existing research in the fields of urban planning, transportation planning, economics, and sociology to highlight the benefits of optimizing land uses at transit stations, with a particular focus on office and retail space. Commercial development is fundamental to creating vibrancy near transit stations, and employment density often serves as a strong proxy for measuring the success of a TOD project. Given the limited supply of land suitable for TOD projects in the Bay Area, and limited submarkets where office developments make sense (i.e., places where rents justify the cost of development, where transit proximity allows for an ability to pull workers from different submarkets in the Bay Area, and where the potential for employment agglomeration exists), commercial space should be prioritized in locations where it is most feasible and where it can provide maximum economic, environmental, and equity benefits.

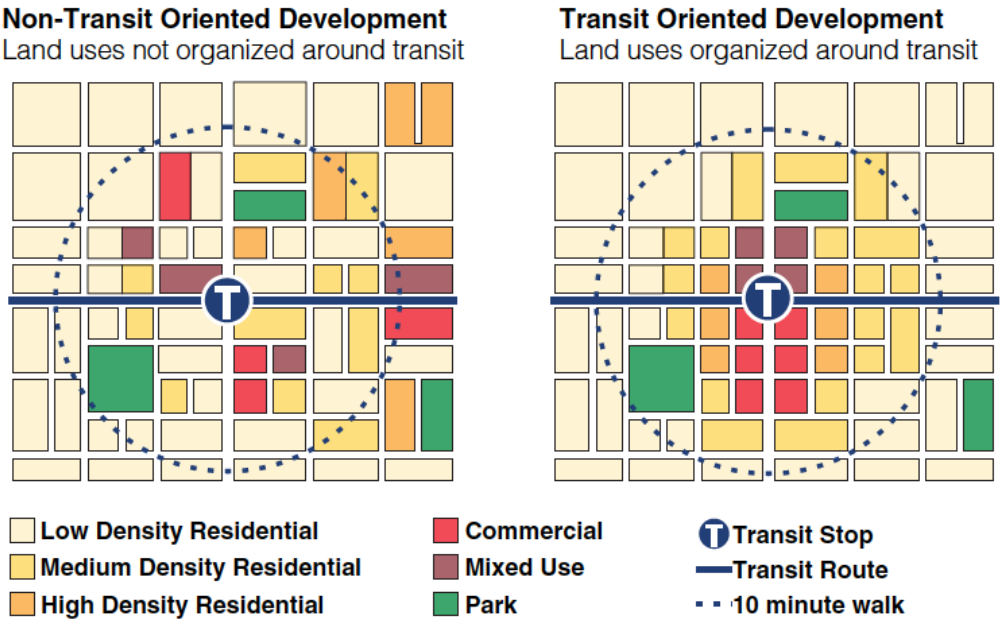
Key findings include:

- Employment density on transit increases transit ridership more than residential density.
    - Within a quarter mile radius from a fixed line station, 10.5% of workers will commute via transit versus 9.5% of residents.
    - For every 1,000 square feet of new commercial floorspace near a rail station, an additional six transit trips are generated per day, yielding an additional $34 million in transit revenue.
    - The higher the job density, the more positive influence on ridership: for every additional 100 employees per acre around a transit station, rail ridership rose by 2.2%.
- People are only willing to walk 500 to 1,000 feet from transit to work, but up to ¼ to ½ mile from transit to home. This suggests that while jobs and housing should be as close to transit as possible, office and retail should be prioritized closest to transit.
- Clustering job growth around transit creates agglomerating effects that boost a region's competitiveness and increase economic productivity more than dispersed job growth.
- Supporting major employment nodes along transit corridors creates strong bi-directional ridership, reducing strain on transit systems and increasing system efficiency.
- Those earning less than $30,000 are 10 times more likely to not own a car, and often have no other choice than to be "transit dependent." Concentrating jobs closer to transit stations can help broaden employment opportunities for the carless, particularly low-income workers, translating to more equitable outcomes for all.
- Mixed-use developments oriented around public transit reduce local greenhouse gas emissions and lower annual household rates of driving.

INTRODUCTION

There have been numerous studies bolstering the case for residential development near transit stations. Less understood, however, are the benefits of commercial development near transit and what increased office and retail space along key transit corridors could mean for the Bay Area's transit system, regional labor force, and economy more broadly. *Transit-oriented development (TOD)*, by nature, is intended to promote mixed-use, bicycle- and pedestrian-friendly, compact urban development by clustering jobs, housing, services, and amenities around public transportation stations, as seen in **Figure 1** below. In practice, a successful TOD project hinges on the right mix of land uses at the appropriate densities, and careful consideration of how proximate each use is to the transit station to promote smart growth.

Figure 1. Transit-Oriented Development versus Non Transit-Oriented Development



Source: Seattle Planning Commission

As the Bay Area recovers from the pandemic, the region's transit systems have struggled to recuperate their pre-pandemic ridership. As of March 2022, Bay Bridge traffic is at 100% of pre-pandemic volumes, while BART ridership lingers at 30%, and Caltrain fares even worse at 18%. As commuters return to the workplace, either part- or full-time, many are choosing to drive alone over taking public transit. This practice, however, is not sustainable long-term for both commuters and public transit agencies. Incentivizing transit use by situating jobs near stations with vacant or underutilized land has the potential to recoup lost ridership, and encourage bidirectional flows of commuters throughout the regional system.

WHY LOCATE JOBS NEAR TRANSIT?

1. Employment Density versus Residential Density

Studies have shown that employment density on transit increases transit ridership more than residential density. Dense job centers are the best tool available for most regions to achieve substantial increases in transit use.[i] Nationally, for every 1,000 square feet of new commercial floorspace near a rail station, an additional six transit trips are generated per day, yielding an additional $34 million in transit revenue.[ii] People are also more willing to work and shop in dense transit-served areas than live in them.[iii] Although there is a need for more housing in the Bay Area and California more broadly, smart growth strategies should be used to bolster the local labor force and revitalize the transit system through increased ridership, while increasing new housing at appropriate locations.

Data collected from transit stations in California found that within a quarter mile radius from a fixed line station, 10.5% of workers will commute via transit versus 9.5% of residents.[iv] As distance from a transit station increases, the inverse is true: while the likelihood of using transit falls dramatically for both residents and workers – the percentage of *residents* commuting via transit is double the percentage of *workers* commuting via transit.[v] People are also more willing to travel on the home side of commuting than the work side: studies have shown that people are only willing to walk 500 to 1,000 feet from transit to work, but up to ¼ to ½ mile from transit to home.[vi] This willingness is due to a greater variety of transportation modes on the home side of commuting (walking, biking, driving) as well as a greater familiarity with residential neighborhoods over commercial neighborhoods. This suggests that while both housing and jobs should be close to transit wherever possible to achieve maximum impact, office and retail should be prioritized closest to transit.

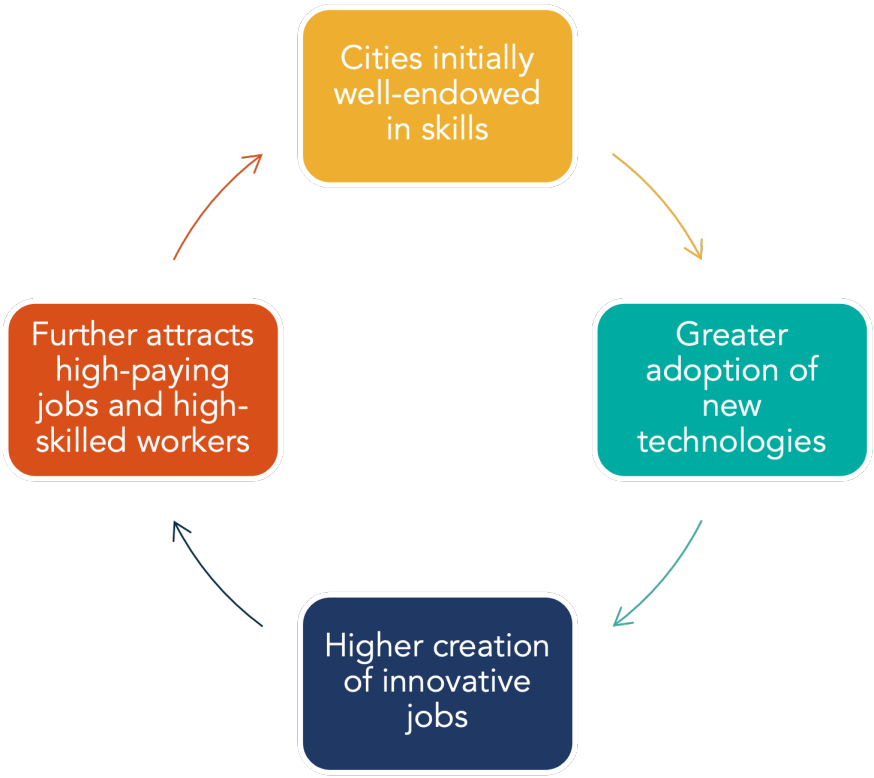
Commercial developments are typically denser than residential developments, which leads to a greater utilization of already scarce transit adjacent land.[vii] For every additional 100 employees per acre around a transit station, rail ridership rose by 2.2%.[viii] It is therefore very important to consider which should be placed "on" transit (directly next to the transit station, or within a quarter mile of the transit station) versus "adjacent" to transit (transit accessible). As the case studies and literature review in subsequent sections show, potential ridership benefits are maximized when commercial developments are closest to the transit station and residential developments are close by.

2. Agglomeration Economies

Silicon Valley and San Francisco owe much of their economic success to the benefits that come when firms and people locate near one another. Also known as *agglomeration economies*, production costs decrease while productivity increases as more firms belonging to the same sector cluster together. This leads to spillover effects into complementary sectors, which increases employment, population, and GDP. At the same time, as regions grow and density increases, *agglomeration diseconomies* may occur, referring to the economic inefficiencies that stem from agglomeration, such as high cost of living, ultimately causing firms or workers to relocate.

The improvement and expansion of regional transportation systems has been shown to be an effective tool in preventing agglomeration economies from weakening. One study found that doubling transit service levels is associated with large increases in employment density and wage increases, and that firms likely receive unanticipated benefits from transit-induced agglomeration.[ix] These positive effects are compounded when companies locate within walking distance of transit stations, as they access a higher share of the labor force. Agglomeration economies grow and become more efficient when transportation systems are more reliable, offer shorter travel times, and expand access to more destinations.[x]

Figure 2. Agglomeration Economies Mutually Reinforce Local Effects of Skills and Technology



Source: OECD Skills Outlook 2019, adapted by Bay Area Council Economic Institute

CASE STUDY: REDWOOD CITY'S PROPOSED TRANSIT DISTRICT

Redwood City is one of the main nodes along the Caltrain Peninsula corridor, connecting the employment centers of San Francisco and the South Bay. Redwood City's station ranks 5th in terms of overall weekday Caltrain ridership, with higher volumes than the more populous cities of San Mateo and Sunnyvale. From 2015 to 2019, Redwood City's ridership grew 31%, while nearby stations in Palo Alto and Mountain View grew 3% and declined -0.2% respectively. This growth occurred as many new office buildings were erected near the train station, bringing new jobs and commuters into Redwood City. As Caltrain struggles to reach pre-pandemic ridership levels, adding jobs directly next to an existing transit station (that will be expanded and used as a bypass station) has the potential to bring back the riders and revenues needed to keep the system running efficiently, while reducing on-site parking demand.

Although transit ridership in Redwood City has grown, most of the area's residents remain highly reliant on cars: households in Redwood City own an average of two cars and travel nearly 20,000 miles per year, while transit ridership among workers is only 6%.[xi] Within Redwood City's Transit District sits the Sequoia Station Shopping Center, a strip mall with a large paved lot, ripe for a reimagined mixed-use TOD development.

The Transit District envisions demolishing the existing strip mall and replacing it with 254 new affordable housing units, 377 market rate units, 170,000 square feet of neighborhood serving retail, 1.2 million square feet of office space, and 2 acres of ground floor open space and childcare use.[xii]

Unlike most transit stations on BART or Caltrain, Redwood City is well equipped to accommodate dense office space, especially one that will become part of an established downtown commerce zone. As opposed to an all-housing or all-commercial development, a large-scale mixed-use development would ensure sustainable support for Caltrain's modernization and expansion by bringing additional jobs to the area. It would also support SamTrans ridership through the station's SamTrans Bus Depot. Given that people are less likely to walk from transit to work than from transit to home, this proposal maximizes potential ridership benefits by placing commercial directly "on" transit, with other residential developments close by.

Sequoia Station was identified by Caltrain's 2040 Service Vision Plan as the ideal location for a mid-Peninsula transfer hub, with proposed improvements such as track expansion, fleet and station upgrades, increased service frequency, and new passing tracks at strategic locations.[xiii] Track expansion would be possible through dedication of private land at Sequoia Station to Caltrain/Redwood City, mitigating costly and lengthy eminent domain processes. Adding this kind of commercial density on a major transfer hub would increase ridership across the entire transit system, supporting the region's transit and environmental goals, while also offering benefits that stretch far beyond Redwood City.

3. Creating Strong Bidirectional Ridership

Bidirectional ridership, also referred to as reverse commuting, is an essential key to the growth, performance, and sustainability of a transit system. The inter-mixing of land uses along transit corridors can produce bidirectional flows at a much higher rate than a single dominant land use (commercial or residential) on either end of a transit line. Transit systems that service dispersed destinations rather than a single central business district, like downtown San Francisco, also see increased service productivity and cost-effectiveness.[xiv]

Bidirectional ridership reduces strain on a transit system as transit volumes during peak commute hours are more evenly distributed throughout the system. This means greater system efficiency, lower maintenance costs for operators, and a more pleasant overall experience for passengers. This makes transit a more attractive commuting alternative to driving, and ultimately translates to increased ridership. A more dispersed network of employment clusters along major transit corridors provides greater employment accessibility for workers and helps reduce sprawl. Multi-destination systems also have higher regional transit ridership per capita, greater passenger occupancy per vehicle mile, and lower real operating expense per passenger or passenger mile.[xv]

4. Lowering Greenhouse Gas Emissions and Reducing Vehicle Miles Traveled

Public transportation and smart growth initiatives are and will continue to be a major factor in combatting global warming and climate change, particularly as they relate to lowering greenhouse gas emissions (GHG) and reducing vehicle miles traveled (VMT). CO2 emissions from transportation are much higher in areas not served by transit. Adding more public transportation options is not enough to encourage fewer car trips; mixed-use developments with amenities oriented around public transit have been found to reduce household GHG emissions by 2.5 to 3.7 tons per year and lower annual household rates of driving 20-40% for those living, working, and/or shopping within transit station areas.[xvi]

New and retrofitted construction of office and commercial space are also increasingly required to meet stricter energy standards. These energy efficient developments consume 45% less land, cost 25% less for roadways, 20% less for utilities, and 5% less for schools, resulting in an efficient use of limited infrastructure and resources while recognizing the need to accommodate future job growth.[xvii]

CASE STUDY: WORKDAY AT WEST DUBLIN/PLEASANTON BART STATION

In 2019, Workday, a leading provider of enterprise cloud applications for finance, human resources, and planning, constructed its new headquarters in Pleasanton, housing 2,200 employees.[xviii] Workday leased the land for its newly built headquarters from the Bay Area Rapid Transit (BART), ensuring it was easily accessible to the nearby West Dublin/Pleasanton BART station.

"We wanted a transit-oriented development. Something that would attract potential employees from San Francisco and Oakland. We don't really have a bus system here, but we have BART," said Workday's vice president of real estate, who noted the proximity to BART is an effective recruiting tool for prospective job candidates.

The City of Pleasanton's Planning Commission staff report noted many benefits of placing jobs near transit including higher transit ridership, a stronger employment base, an increase in business activity, and an advancement of the City's Climate Action Plan.[xix] Shortly after construction was complete, Pleasanton's city manager stated that "this public-private partnership with Workday, BART, and the City of Pleasanton allowed this project to move quickly and adds a great benefit to our City, its residents, and nearby businesses."[xx]

5. Equitable TOD as a Tool for Increasing Job Opportunity

Not all transit-oriented development is equitable, but TOD projects that benefit underserved members of the community further enhance the economic effects outlined in previous sections, and improve the livelihoods of lower-income workers throughout the region. Equitable TOD involves a combination of mixed-income residential development, as well as commercial development that creates jobs that pay across the wage spectrum. Equitable TOD encourages greater access to employment opportunities and essential services for those who need them most, particularly individuals who do not have access to a car or who are unable to afford one.

Those earning less than $30,000 are 10 times more likely to not own a car, and often have no other choice than to be "transit dependent."[xxi] Concentrating jobs closer to transit stations can help broaden employment opportunities for the carless, particularly low-income workers.[xxii] In order to serve those who are transit dependent and promote equitable access, communities must be thoughtful and precise with land use around major transit stations, and develop "destination" (employment/commercial) nodes at strategic transit stations and "origin" (residential) nodes at others.

Savings from increased transit ridership would also allow low-income car-owning households to reallocate some of those funds to other higher priority expense items. A 2010 study found that people who have access to high quality transit could save an average of $7,185 per year (in 2022 dollars).[xxiii] However, this is only possible with a robust transportation system supported by a well-planned region with considerations for trip origins and destinations. Improving job accessibility for transit users requires designing and maintaining a transit system that can provide high and reliable service frequency, which is only feasible if the system is supported by land uses that foster greater ridership and thus generate more revenue. One of the biggest contributors to low ridership is infrequent service or waiting. Improving transit services to accommodate these concerns would be helpful for many local people who do not have access to cars.[xxiv]

CASE STUDY: GOOGLE'S DOWNTOWN WEST IN SAN JOSE

In May 2021, Google and the City of San Jose reached an agreement to develop 80 acres of land in downtown San Jose, transforming a vastly underutilized area into a mixed-use commercial, residential, retail, and open space neighborhood accessible to both Google employees and local residents.[xxv] This Google village, referred to as Downtown West, will accommodate up to 7.3 million square feet of office space, 4,000 residential units of which 25% will be designated as affordable housing, 500,000 square feet of retail space that will include shops and restaurants, 300 hotel rooms, and 15 acres of open space.[xxvi]

Integrated with Diridon Station, currently a hub for Caltrain, ACE Train, Amtrak, light rail, Capitol Corridor, and bus connections, this TOD offers tremendous appeal to employers, transit agencies, workers, and residents alike. Diridion Station is projected to receive more commuter traffic due to Caltrain electrification efforts, increasing the frequency of service operating between San Jose and San Francisco. BART is also expected to build a new station at the Diridon transit complex.

"Downtown West is poised to shift how people think of office buildings and how such employment hubs are woven into the fabric of urban centers."

- Scott Knies, Executive Director of the San Jose Downtown Association

According to Google, Downtown West will create more than 5,700 prevailing wage construction jobs with supplier diversity and local hire targets. An additional 25,000 office and retail jobs will be created once the project is completed. Google has also set ambitious climate targets for its campus, committing to net zero carbon emissions and 65% non-single occupancy vehicle trips. It has also pledged $150 million to a Community Stabilization & Opportunity Pathways Fund rooted in social equity and community participation.[xxvii]

CONCLUSION

Land use planning that provides more space for jobs near transit stations should be an important component of local and regional planning decisions. Transit-oriented development that emphasizes mixed-use neighborhoods of high density commercial and residential development can serve as a generator of new opportunity for the regional workforce. Prioritizing residential-only TOD deprives a transit system of benefits to the economy, the environment, racial and socioeconomic equity, and is ultimately short sighted with respect to smart regional growth.

In the Bay Area, where jobs are clustered in San Francisco, San Jose, and Oakland, adding office and commercial space near transit in other cities can help to disperse employment opportunity more evenly. Jobs that are easily accessible via transit play important roles in assisting transit systems' ridership recovery, limiting congestion and emissions on roadways, and allowing employers to recruit over wider geographies. From a municipal perspective, employment at transit stations also brings daytime population into a city. This population will spend money in restaurants, retail establishments, and within the service sector, bringing additional economic activity to the city and supporting nearby small businesses.

While a shift toward greater remote work may cause changes to office demand in the short-term, physical locations for jobs will continue to play an important role in the economy. Cities that can offer vibrant downtowns that attract workers to an office easily accessible via transit will be the ones who succeed in providing opportunity to their residents, leading to improved fiscal positions. Placing jobs on or directly next to transit through high-density transit-*oriented* development can be a major catalyst for this economic vibrancy and can help mitigate many of the concerns generated by low-density transit-*adjacent* development.

Acknowledgements

This brief was prepared by the Bay Area Council Economic Institute and was authored by:

Abby Raisz, Research Manager
Paul Fitchen, Research Assistant

Endnotes

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