

Measuring the Promise of Transit-Oriented Development:

A Proposed Methodology for BART



TransForm



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About TransForm

TransForm promotes walkable communities with excellent transportation choices to connect people of all incomes to opportunity, make California affordable, and help solve our climate crisis. With diverse partners we engage communities in planning, run innovative programs, and win policy change at the local, regional, and state levels.



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I. Introduction

In 2018, TransForm partnered with BART to provide support with technical analysis and community engagement for new transit-oriented developments at BART’s “Urban with Parking” Stations, focused on case studies of the Lake Merritt and El Cerrito Plaza BART stations. ARUP conducted research and analysis for BART as well, some of which is referred to in this report. This work was funded by a Caltrans Sustainable Transportation Planning Grant.

TransForm’s work for this project focused in particular on residential parking analysis, station access strategies, and community engagement in light of the fact that new development will provide more homes while reducing BART patron parking at both stations. For more than a decade, TransForm has pioneered initiatives to right-size parking at transit-oriented development (TOD), research the climate and equity benefits of affordable homes, and facilitate deep and authentic community engagement in planning processes, particularly with communities of color and other underserved neighborhoods.

Most of the outreach for this project was completed before the COVID-19 pandemic hit in early 2020, though some was completed virtually after that. The pandemic was ongoing as of the writing of this report, with profound impacts for public transit, its ridership, and transit-oriented development expected to continue for years to come. Right now, most transit riders are transit-dependent, and BART’s riders are much more likely to have low incomes and be people of color than before the pandemic, as evidenced by BART’s 2020 Customer Satisfaction Survey.¹ Commuting trends will continue to change, as will considerations for TOD, but the need for affordable homes near transit will remain high.

TransForm strongly supported BART’s TOD Policy Goals before and after their adoption in 2016, and was on BART’s technical advisory committee for the 2016 TOD Policy update. This project is also key to achieving BART’s adopted Station Access Policy goals. **It has been a valuable opportunity to test and support the implementation of BART’s groundbreaking policy work, advance a shared vision for smart and equitable TOD, and glean lessons that can be applied to other TOD efforts on publicly owned land near high-quality transit.**

¹ BART, Customer Satisfaction Survey, October 2020.

“Over the next decade, BART will implement a TOD program that is ambitious and opportunistic, aimed at strengthening the connections between people, places, and services while enhancing BART’s value as the backbone of the region’s transit system. BART’s priority will be to collaborate with local jurisdictions and communities to deliver quality, equitable infill development near stations.”²

While this report is a technical document and a grant deliverable, it is also an advocacy tool that expresses TransForm’s mission around transit-oriented development and right-sized parking policies. We hope it will prove useful to BART and stakeholders of the Lake Merritt and El Cerrito Plaza station developments and to public agencies, developers, and cities that support TOD in and beyond the San Francisco Bay Area.

Background: The Bay Area Needs More Homes with Less Driving

The Bay Area is experiencing a severe housing crisis. Low-income households, those earning 50 percent to 80 percent of Area Median Income (approximately \$50,000 to \$75,000 in 2017), are particularly hard hit.

- These households are often rent burdened, which means they spend more than 30 percent of their income on housing. In 2017, 44 percent of households with low incomes spent more than 35 percent of their income on housing, up from 28.1 percent in 1990.³
- They are at high risk of displacement. In 2017, 42 percent of households with low income were at risk of displacement, up from 25 percent in 1990.⁴
- Their numbers will grow. Today, over 250,000 households with Very Low Incomes don’t have access to an affordable home. The region’s population is growing from 7.7 million in 2015 to a projected 9.1 million in 2035—an increase of 18 percent.⁵

Housing is a human right: everyone deserves a place to live, just as they deserve access to education and healthcare. Causa Justa :: Just Cause (CJJC) defines displacement as “the out-migration of low-income people and people of color from their existing homes and neighborhoods due to social, economic, or environmental conditions that make their neighborhoods uninhabitable or unaffordable.”⁶ Displacement disrupts communities and contributes to urban sprawl.

² BART, BART’s *Transit-Oriented Development Program Work Plan*, Public Draft, August 2020, p.7

³ Metropolitan Transportation Commission (MTC), *Vital Signs*, February 2019

⁴ MTC, *Vital Signs*

⁵ MTC, *Vital Signs*

⁶ Causa Justa :: Just Cause, *Development without Displacement: Resisting Gentrification in the Bay Area*, Date unavailable.

When people move to more affordable locations further from job centers, services and transit, they have to drive longer distances which contributes to climate change. The transportation sector accounts for more than 40 percent of GHGs in the state of California, with 28 percent of that, the largest share in the sector, from passenger vehicles.⁷ It's been proven that people living near BART stations drive less and therefore create fewer GHG emissions. Nearly three-quarters of households living within half a mile of a BART station own one vehicle, or none at all.⁸ People living within half a mile of a BART station are three times more likely than people who live further from a BART station to walk, bike, or take public transit to work.⁹

Transit-oriented development (TOD) directly contributes to meeting state and regional climate action goals. When people use public transit instead of driving private vehicles, VMT and GHGs decrease while traffic congestion and air quality improve. The climate benefits of affordable homes in TOD are even greater, as households with low incomes own fewer vehicles and use public transit more often than households with higher income living in the same location.¹⁰ These trends are closely associated with transit ridership benefits and the social benefits of minimizing displacement. **Development of housing, especially affordable units, on BART property is crucial to addressing the Bay Area's interrelated housing, climate, and affordability crises.**

BART's Role in Advancing Solutions with Housing

Bay Area Rapid Transit (BART) is uniquely positioned to address these urgent issues by developing its public land with housing. Public support to maximize both the total number of housing units and the number of affordable housing units is crucial for BART to take full advantage of this incredible opportunity.



*Farmer's market at Fruitvale Village
Kieron Slaughter/TransForm*

⁷ CARB, *California Greenhouse Gas Emissions for 2000 to 2018*, 2020 edition

⁸ BART, *Transit-Oriented Development Guidelines*, Version 2.0, May 2017, p.9

⁹ BART, *Transit-Oriented Development Guidelines*, p.9.

¹⁰ TransForm, California Housing Partnership Corporation, *Why Creating and Preserving Affordable Homes Near Transit is a Highly Effective Climate Protection Strategy*, 2014.



First and foremost, BART is a transit agency that helps more than 400,000 people a day get where they need to go around the Bay Area.¹¹ BART also has a key role to play in transit-oriented infill development, as BART owns an estimated 250 acres of developable land spread across 27 of its 50 stations.

The BART system was originally designed with the assumption that people would drive to suburban stations. In the 1970s when BART started operating, developable land was plentiful, traffic was manageable, and the air was clear, so the design for suburban stations included large surface parking areas. A lot has changed since the BART system was designed and built more than 50 years ago. Today, developable land is scarce, the need for housing is high, the freeways are congested, and the climate crisis affects our daily lives.

BART's TOD policy goals boldly address the region's crises by linking public transit, housing, and land use. BART plans to build 20,000 new housing units on its property by 2040, of which 7,000 units (35 percent) will be considered affordable — that is, sold or rented at below market rate (BMR).¹² In addition to addressing housing and climate change crises, the inclusion of affordable homes will reduce displacement of households with low incomes, thereby maintaining the socio-economic diversity the region needs to thrive.

BART will carefully consider the balance of housing units and parking spaces for BART customers for its future TODs. Because of financial constraints, the number of housing units that can be built is directly related to the number of parking spaces that are built for BART customers. Both have a cost and take up space, so building less parking enables more homes to be built. Enhanced station access for people biking, walking, or taking transit to the station, as well as new carpooling and ride-sharing provide BART riders with options for getting to/from stations that were unimaginable when the system was designed. **Everyone needs a home; not everyone needs a parking space at a BART station.**

¹¹ BART, *Annual Report 2018*, Strategic Indicators Data Book 2019, p. 4.

¹² BART, *Transit-Oriented Development Guidelines*, p.9.

The Role of Cities to Improve Outcomes from TOD

Development has profound impacts on the surrounding community, which too often have come at a grave cost to long-time neighbors at risk of displacement. Real estate values for residential and commercial properties near BART stations are higher than for those farther away from BART stations.¹³ Development on BART property will capture that value and likely further increase the value of property in the surrounding area. The resulting gentrification would add financial burden and the risk of displacement to current residents, particularly renters with low incomes. Landlords could force such tenants out of their homes in order to benefit from increasing real estate values. Homeowners with financial hardship could choose to cash in and move, which can also damage the social fabric of communities and trigger other negative climate and transportation impacts of displacement.

These issues shouldn't halt or oppose TOD projects outright, they should motivate local governments and concerned citizens to minimize harm and maximize benefits for vulnerable neighbors. In order for our communities to grow equitably and thrive, local governments must protect residents, particularly those who are struggling to stay in their communities, from displacement. Cities must adopt policies to protect vulnerable residents from displacement. Such policies include Just Cause eviction ordinances; anti-harassment policies prohibiting landlords from forcing tenants out by neglecting maintenance, through intimidation, or with buy-out offers; and right of first refusal, relocation assistance, and right to return policies.¹⁴ These policies should ideally be put in place before the development of BART land.

About this Report

This report will summarize key findings from the technical assistance and community engagement work TransForm conducted during this project, with an eye to what may be applicable to other agencies and cities within and beyond the Bay Area. It also includes recommendations for BART and other agencies that hold developable public land in close proximity to transit.

The chapters in this report present the following key findings from work conducted with a Sustainable Communities Grant from Caltrans. These grants support local and regional sustainable communities' strategies and planning to achieve California's greenhouse gas reductions targets.

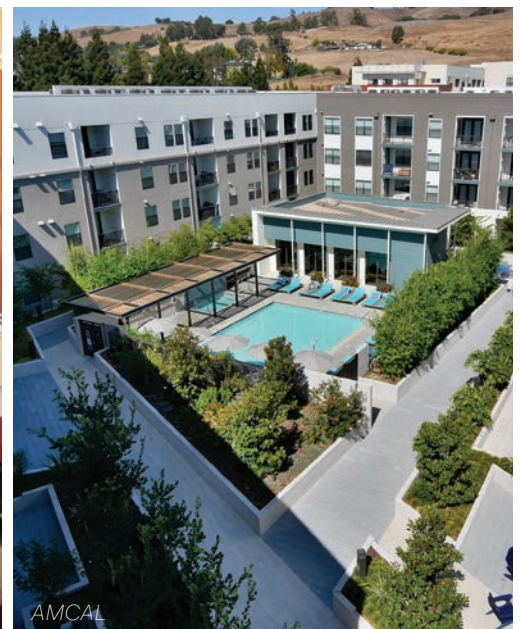
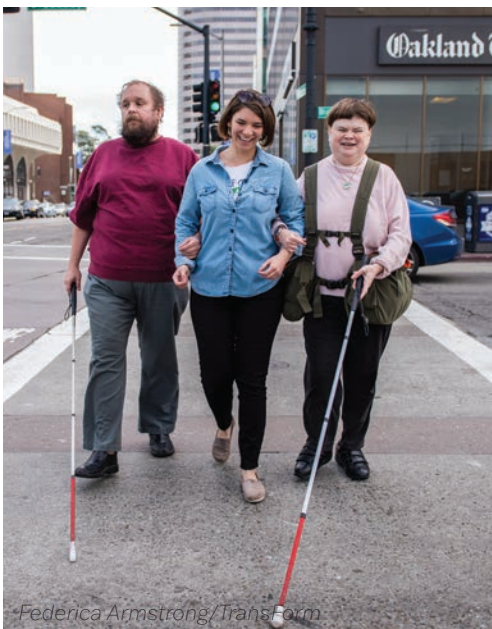
¹³ Strategic Economics, *Property Value and Fiscal Benefits of BART*, August 2014.

¹⁴ B Causa Justa :: Just Cause, *Development without Displacement*, p.57.

- A proposed methodology for evaluating the impacts and benefits of new TOD and right-sized levels of replacement parking within and beyond the BART system, including the results of applying this methodology to El Cerrito Plaza development scenarios.
- Lessons learned from community engagement around the Lake Merritt station and El Cerrito Plaza station developments.
- An initial list of strategies that can be implemented to reduce BART patrons who drive and park at the stations and increase sustainable access to stations.
- Takeaways from a workshop where project stakeholders discussed how this work at Lake Merritt and El Cerrito Plaza stations may be applied to the other “Urban with Parking” BART stations. Input and feedback are integrated in different places in the report.

Based on these findings and TransForm’s work on this project and other related initiatives, **the conclusion of this report includes the following recommendations, which are explained more fully in the last section.**

1. To measure progress towards TOD goals, BART should incorporate a methodology evaluating the many benefits and tradeoffs of development and BART parking, similar to the one used in this report.
2. BART should prioritize housing production, especially affordable housing, when making decisions between different development scenarios.
3. When doing community engagement for TOD, public agencies and developers should start early, use multiple strategies, and leverage trusted relationships that already exist.





Federica Armstrong/TransForm

II. Proposed Methodology for Calculating Progress Towards BART's TOD Policy Goals

“What's Measured Improves”

This aphorism by Peter Drucker, a management consultant, means that to know if one is successful, their goals must be clearly defined, measured, and tracked. Quantifying progress shows when goals are reached and helps indicate whether something needs to be adjusted. That is why TransForm created this methodology for evaluating success towards BART's TOD Policy Goals.

BART has many important documents to guide its TOD Program, but a methodology for evaluating projects-and the program itself-has yet to be adopted to aid the agency in measuring success. A documented, consistent approach that can be replicated also supports institutional continuity and prevents mission drift even when there are changes in staffing.

This report uses the methodology described below in two ways.

One way is to quantify the collective impacts of TODs at different stations. This can be a tool to evaluate the potential impact and overall success of the TOD program over time. Section IV “Methodology Applied to “Urban with Parking” Stations demonstrates this use.

The methodology is also useful for comparing conceptual development scenarios at one station. Measuring the degree to which individual conceptual developments progress BART's goals allows clearer comparison and understanding of tradeoffs when selecting one proposal over another. Section IV provides a vignette for how this can be done using El Cerrito Plaza as an example. More detail is available from a previous report completed with this grant, El Cerrito Plaza Station Development Scenarios.¹⁵

¹⁵ TransForm, *El Cerrito Plaza Station Development Scenarios*, 2021.

The Approach

TransForm used BART's Board-adopted TOD Policy Goals and Performance Measures and Targets as the basis for criteria to evaluate conceptual development scenarios at El Cerrito Plaza, and BART agreed.¹⁶ TransForm then applied the same methodology to evaluate most of BART's other Urban with Parking stations. TransForm intended this methodology and data results to be used primarily by BART and city staff and decision-makers, and can be shared with community members in a more digestible format.¹⁷

The methodology, described below in the section "How Performance Measures are Calculated," identifies and defines metrics to measure progress towards each of BART's TOD goals. This section includes sources of information and an explanation of how to calculate each metric. It further demonstrates how to calculate them for six of BART's "Urban with Parking" stations, and summarizes their collective contribution towards TOD goals in Table 2. A complete analysis of each of the six stations is included in the Technical Appendix of this report.

This section lays out BART's TOD Policy Goals and the performance measures to evaluate progress towards reaching them. After obtaining confirmation with BART on this approach and choice of metrics, TransForm conducted the technical analysis for each station.

What's Measured and What's Not

Most of the specific measurements for each Policy Goal are sourced from BART's adopted TOD Policy Performance Measures and Targets, and are referenced as such in the "How Performance Measures are Calculated" section, below. However, TransForm did not use all of BART's Draft Performance Measures and also came up with new measures. This



¹⁶ BART TOD Policy Goals, Adopted 2016, Amended 2020.

BART TOD Performance Measures and Targets, Adopted 2016.

¹⁷ TransForm agrees with feedback from the BART TOD stakeholder workshop held in January 2021 that indicated this is oriented to decision-makers and staff, and potentially too much data, if shown all at once, for use with general community outreach unless the information is presented in more digestible formats. It was not designed to address individual BART customer station access concerns.

does not imply that other Draft Performance Measures should be excluded from future calculations; it is simply a reflection of the limitations of the scope of work for this report.¹⁸

The additional measures added in this methodology that are not yet adopted by the BART Board apply to the Value Capture / Value Creation policy goal. Currently the Draft Performance Measure, “Pilot new finance mechanisms to support transit,” is not something TransForm could measure. Therefore, TransForm proposed evaluating revenue and costs as they relate to future TOD and rebuilding BART patron parking.

TransForm recommends BART incorporate this methodology, and that other transportation agencies incorporate a similar one that works for them. It could be consistently applied to future TOD to assist with project-level decision making and overall program evaluation. This methodology is not intended to be a static, final product but rather a work in progress. TransForm encourages reflection and improvement on this methodology, especially on changing or adding performance measures for each policy goal as an approach becomes more refined. Future work should build on this framework to make it more robust and include more aspects of TOD such as commercial components and opportunities for disadvantaged and small businesses.

Table 1. BART TOD Policy Goals and Performance Measures¹⁹

BART TOD Policy Goal	Description of Policy Goal	Performance Measure
Complete Communities	Partner to ensure BART contributes to neighborhood/district vitality, creating places offering a mix of uses and incomes.	<ul style="list-style-type: none"> • More land uses (A1) • Quantity of units (A1 & A2)
Sustainable Communities Strategies	Lead in the delivery of the region’s land use and transportation vision to achieve quality of life, economic, and greenhouse gas (GHG) reduction goals.	<ul style="list-style-type: none"> • Reduce GHG emissions (B4)
Ridership	Increase BART’s ridership, particularly in locations and times when the system has capacity to grow.	<ul style="list-style-type: none"> • More people riding BART (C1)
Value Creation / Value Capture	Enhance the stability of BART’s financial base by capturing the value of transit, and reinvesting in the program to maximize TOD goals.	<ul style="list-style-type: none"> • More annual revenue from the development and/or parking fees • Less cost to rebuild and maintain parking
Transportation Choice	Leverage land use and urban design to encourage non-auto transportation choices both on and off BART property, through enhanced walkability and bikeability, and seamless transit connectivity.	<ul style="list-style-type: none"> • Reduce vehicle-miles traveled (E3) • Reduce driving and parking at stations
Affordability and Equity	Serve households of all income levels by linking housing affordability with access to opportunity.	<ul style="list-style-type: none"> • Number of new Below Market Rate (BMR) Homes • Increase percentage of BMR homes system-wide

¹⁸ BART Performance Measures and Targets, Standards A2, A4, B1, B2, B3, C2, D1, E1, E2, F3 are not included in the calculations for this report.

¹⁹ The specific BART Draft Performance Measure is referenced if applicable.

Summary of “Urban with Parking” Station Development Performance

Based on TransForm’s calculations of the stations’ performance measures, Table 2 below shows the collective contributions to BART’s ambitious TOD Policy Goals. A detailed table depicting each station’s individual contributions is in section IV “Methodology Applied to “Urban with Parking” Stations.

Table 2. Summary of TOD Performance for “Urban with Parking” BART Stations ²⁰

(El Cerrito Plaza, North Berkeley, Ashby, Rockridge, Fruitvale, San Leandro, Glen Park)

BART TOD Policy Goal	Performance Measure
Complete Communities	<ul style="list-style-type: none"> Replaces surface parking lots with residential land use, and potentially other uses to be determined depending on local desires. <p>The sites could accommodate roughly 4,800 homes, or 24% of BART’s 20,000 unit goal by 2040.</p>
Sustainable Communities Strategies	<ul style="list-style-type: none"> 67% fewer greenhouse gas emission than regional household average emissions.
Ridership	<ul style="list-style-type: none"> Approximately 6,900 more people riding BART everyday
Value Creation / Value Capture	<ul style="list-style-type: none"> Approximately \$19,047,900 more annual revenue.²¹ <p>Approximately \$76,145,400 in costs to rebuild and maintain parking.</p>
Transportation Choice	<ul style="list-style-type: none"> 83.9% fewer vehicle-miles traveled compared to the regional household average. On average, about 90% of BART riders will access the stations by sustainable modes, a 14% increase from current conditions.
Affordability and Equity	<ul style="list-style-type: none"> The sites could accommodate roughly 2,035 BMR homes, or 29% of BART’s 7,000 unit goal by 2040.

²⁰ These are rounded numbers; more detail is available in the individual station analyses in the Technical Appendix, and Table 6.

²¹ Sum of Annual Net Revenue From Parking and Fares, Annual Property Tax and Annual Ground Lease

How Performance Measures Are Calculated

This section describes how TransForm calculates the performance measures to evaluate progress towards BART's adopted TOD Goals.

Complete Communities

TransForm calculates progress towards this goal using the following from BART's TOD Performance Measures:

- Replacing the current land use, parking, and/or **adding land uses** such as residential and commercial uses (referred to as Standards #A1 and A2 in BART Performance Measures and Targets).
- The **number of units produced** on BART property (referred to as Standard #A1 in BART Performance Measures and Targets).²²

Sustainable Communities Strategy

TransForm calculates progress towards this goal by the **reduction in greenhouse gas (GHG)** emissions (referred to as Standard #B4 in BART Performance Measures and Targets).

TransForm calculates residential GHG reduction with the GreenTRIP Connect model.²³ GreenTRIP Connect is a free, evidence-based online tool created by TransForm that instantly calculates GHG, VMT and parking demand of multifamily buildings in California. TransForm compares GHG emissions between a conceptual development that does not limit parking or include TDMs, with a conceptual development that does. The TDMs include:

- **Limiting residential parking** to 0.5 parking spaces per unit (referred to as Standard #E1 in BART Performance Measures and Targets).
- Providing **unbundled parking**—separating the cost of parking from the cost of housing—charging \$100 per month for a parking space.
- Providing a **car share membership** for every home.
- Providing two free or deeply **discounted transit passes** per home.

For background, AB 2923 and BART's TOD Guidelines lay out the maximum parking ratio for new residential and commercial development at each station. AB 2923 (2018) required BART to set zoning requirements within 0.5 miles of their stations, and this included parking maximums of 0.5 spaces per unit for these seven stations, with no parking

²² BART TOD Policy Goals 2020; BART TOD Performance Measures and Targets 2016.

²³ GreenTRIP Connect

²⁴ BART website, AB 2923 Implementation, Updated June 24, 2020, accessed January 2021.

minimums.²⁴ Residential unbundled parking and daily parking fees for commercial uses are required per BART's Board-adopted TDM Requirements for TOD.²⁵ Data for the cost of residential market-rate monthly parking for each station area was not readily available, therefore \$100 per month was used in GreenTRIP Connect modeling.

Ridership

TransForm calculates progress this goal by the estimated **new riders** from the station (which is slightly different from Standard #C1 in BART Performance Measures and Targets, which specifies weekday riders). TransForm uses the updated BART TOD Access Model to estimate ridership changes resulting from new conceptual development and the parking spaces available in each scenario. One of the model inputs is the number of parking spaces for BART riders, which is calculated by the percent of replacement parking for BART customers that would be rebuilt. For simplicity, TransForm set the number of cars households would bring to match a 0.5 parking ratio, which is the maximum allowed for residential development at this station.²⁶

Each station had different inputs depending on the conceptual design, which are detailed in the Technical Appendix. The inputs that were constant across stations were the daily parking fee, parking turnover, and proposed (commercial) development. For simplicity, the input for how many cars households would own was set to match the 0.5 parking ratio, which is the maximum allowed for residential development at Urban with Parking stations. For example, a conceptual 100 unit building with 50 percent BMR homes, and 30 percent replacement BART parking (currently has 100 spaces) would have the following inputs:

Table 3: Inputs to Determine Ridership

BART TOD Policy Goal	Input
Daily Parking Fee	\$3.00
Turnover	1.1
Occupancy	1.1
Station Structured Parking Spaces	30
Proposed Development (1,000 square feet)	0
Market Rate Housing, 1 Auto Ownership	25
Market Rate Housing, 0 Auto Ownership	25
Affordable Housing, 1 Auto Ownership	25
Affordable Housing, 0 Auto Ownership	25



²⁵ BART Transit-Oriented Development Transportation Demand Management Program, Public Draft, August 2020.

²⁶ The numbers are based on initial assumptions for the percentage of replacement parking. This varies for each station because not all "Urban with Parking" stations are the same. Further analysis will be needed to define the ranges of replacement parking, and final replacement parking levels will only be determined once the developer is selected, the station access study and site design are complete, and funding strategies are in place.

Value Creation and Value Capture

According to BART's Performance Measures and Targets, the agency has not defined what to measure towards this goal. TransForm measured progress towards this goal using estimated **revenue and costs** (in dollars).

Revenue can come from the development's land uses including ground lease, new property taxes, BART fares and parking fees (referred to as Standard #D1 in BART Performance Measures and Targets). A ground lease is "an agreement in which a tenant is permitted to develop a piece of property during the lease period, after which the land and all improvements are turned over to the property owner."²⁷ Costs can come from rebuilding and maintaining parking for BART riders. Economic & Planning Systems, Inc. has estimated revenue from leases and new taxes for each station.²⁸

TransForm used numbers from these two reports and estimated revenue from daily parking fees and fares using the updated Station Access Model, as described above. The number of parking spaces for BART riders is one of the model inputs.

Transportation Choice

TransForm measures progress towards this goal by calculating the reduction in vehicle miles traveled and mode shift away from driving.

- **Reducing Household Driving**

Driving can be measured in Vehicle-Miles Traveled (VMT), which refers to the number of miles a vehicle travels over a period of time. BART specifies that the goal is a reduction in VMT equivalent to GreenTRIP Certification standards, which means that households should not exceed 25 to 35 VMT/day, depending on place type (referred to as Standard #E3 in BART Performance Measures and Targets).²⁹ That represents 40 to 56 percent less than the regional average of 62 VMT/day.³⁰

BART elaborated in their new TDM Program that a development project must employ TDM strategies, and those TDMs should reduce estimated VMT by 20 percent compared to the project without TDMs.

TransForm measures residential VMT reduction, with and without TDMs, using GreenTRIP Connect. However, TransForm did not measure commercial VMT generated by ground-floor retail or other non-residential uses attached to the development. We recommend BART do so in the future.

²⁷ Chen, James. Investopedia, Ground Lease, July 28, 2020. Accessed online January 14, 2021.

²⁸ Draft Economic Impact of BART Transit Oriented Development; Economic & Planning Systems, Inc, EPS #201018, 2020.

²⁹ GreenTRIP Certification was created by TransForm to recognize multifamily housing that reduces VMT and GHG emissions. Standards can be found online in the GreenTRIP Certification How-to-Guide.

³⁰ MTC Vital Signs. February 2019. Average Daily Miles Travelled is 23 per person per day. The average household size in the Bay Area is 2.69 persons. Therefore 23 VMT x 2.69 = 61.68 VMT/household/day.

• Reducing Driving and Parking at Stations

BART wants to shift travel modes away from driving and parking at the station towards sustainable transportation alternatives such as walking, biking, taking the bus or getting dropped off. BART specifically targets “home origins” in their mode shift efforts, with the aim of shifting how people travel from home to the station away from driving. TransForm calculated estimated mode shift resulting from a conceptual TOD at the stations using the following information: ³¹

- Average weekday station entries (2019)
- Percent of home-origin entries
- Percent of park-and-ride mode share
- Percent of sustainable access mode share
- Current number of parking spaces
- Percent of estimated parking replacement for that station
- Percent of people who would switch to sustainable transportation modes and use the same station ³²

Affordability and Equity

TransForm calculates progress towards this goal with the **number of BMR units proposed** and how that increases the **share of housing units systemwide that are affordable** (referred to as Standard #F1 and #F2 in BART Performance Measures and Targets). Assuming the proposals meet the minimum requirements for BMR units, 20 percent BMR was used as model inputs in both GreenTRIP Connect and the BART Station Access Model. For simplicity, the number of units for VLI and LI were split evenly.

Evaluation metrics will include the number of BMR units proposed on BART property (referred to as Standard #F1 in BART Performance Measures and Targets) and how that increases the share of housing units systemwide that are affordable (Standard F2).



³¹ Sources for this information: FY2019 daily average ridership, BART 2015 Station Access Profile, BART TOD Station Access Model.

³² This is known as the “Distance-bin” method, developed by Fehr & Peers; included in BART’s TOD Station Access Model.

Assuming the proposals meet the minimum requirements for BMR units, 20 percent BMR was used when evaluating both scenarios. For simplicity, the number of units for VLI and LI units were divided in half in the GreenTRIP Connect model.

BART's Affordable Housing Policy aims to produce 7,000 affordable housing units on BART property as part of a larger total goal of 20,000 units, which would result in 35 percent BMR units systemwide by 2040.³³ The policy states that at least 20 percent of cumulative units at any given station must be BMR.³⁴ It furthermore specifies a priority for residential units made available to Very Low Income (VLI, < 50% AMI) and Low Income (LI, 51-80% AMI) households.³⁵ This would apply to households in the Bay Area earning less than \$46,650 and \$74,640 respectively.³⁶

BART plays a crucial role in enabling our region to meet housing production targets as determined by the state. Based on recently released numbers from the California Department of Housing and Community Development, the Bay Area must plan for 441,176 new housing units from 2023 to 2031, 57 percent of which are expected to be BMR units. These are derived from the Regional Housing Needs Assessment (RHNA) process that identifies the "total number of housing units, separated into four affordability levels, that every local government in the Bay Area must plan to accommodate for the period from 2023 to 2031."³⁷

³³ BART, *Adopted TOD Performance Targets 2040 for BART Board*, January 1, 2016.

³⁴ BART website, Transit-Oriented Development (TOD), Updated January 22, 2020, accessed January 2021.³⁵ GreenTRIP Certification was created by

³⁵ BART, *Affordable Housing Policy*, Adopted January 28, 2016.

³⁶ TC Vital Signs, *Income*, accessed December 4, 2020. In 2017, the Bay Area median household income was \$93,300.

³⁷ Association of Bay Area Governments, *Regional Housing Needs Allocation Proposed Methodology: San Francisco Bay Area, 2023-2031*, October 2020.



III. Methodology Applied to El Cerrito Plaza

TransForm applied the methodology for measuring performance, detailed above, to the El Cerrito Plaza BART station in order to compare and contrast how different conceptual developments would contribute to BART's TOD policy goals. One benefit of quantifying these goals and looking at them all at once is the ability to clearly see the magnitude of the differences between scenarios and the trade-offs between goals. Presenting the scenarios' performance in this way enables more informed decision-making for project design.

What follows is a case study for El Cerrito Plaza. As previously mentioned, further detail about the scenarios and analysis is available in a separate report, *Comparing El Cerrito Plaza BART Station Development Scenarios*, which was completed under the same Caltrans grant.³⁸

TransForm compared two development scenarios to existing conditions at the El Cerrito Plaza BART station. Right now BART's property to be developed consists of a surface parking lot. One conceptual development scenario would replace 50 percent of the current parking spaces and the other scenario would replace 5 percent of the current parking spaces.

The results of TransForm's analysis show that Scenario 2, which would replace 5 percent of BART parking spaces at El Cerrito Plaza, makes the most progress toward BART's TOD Policy Goals. In all but one Performance Measure, Scenario 2 produces more favorable results. Scenario 2 results in more new homes overall and more affordable homes, helping to minimize displacement of low-income households. It creates less traffic and fewer GHG emissions. More people choose sustainable ways to get to the station, such as walking and biking, because limited parking availability would make driving much less convenient. There is a substantial increase in revenue from the development itself, especially without the additional cost that building a new parking garage would incur. The only Policy Goal that Scenario 2 underperforms in is Ridership, and this is only by 100 fewer new riders than Scenario 1.

TransForm considers the magnitude of the benefits from the contributions to the other Policy Goals — which affect more people and the entire region — to outweigh this minor shortcoming.

³⁸ TransForm, *El Cerrito Plaza BART Station Development Scenarios*, February 2021

Comparing Development Scenarios

Table 4 below, sourced from TransForm's aforementioned report, summarizes how two conceptual developments compare to the existing conditions.

Table 4: Comparing Development Scenarios at El Cerrito Plaza BART Station

Legend for performance evaluation	Existing Conditions	Scenario 1 (50% of Existing BART Parking)	Scenario 2 (5% of Existing BART Parking)			
<table border="1"> <tr> <td style="background-color: #d9ead3;">Less favorable</td> </tr> <tr> <td style="background-color: #d9ead3;">Favorable</td> </tr> <tr> <td style="background-color: #5cb85c;">More favorable</td> </tr> </table>	Less favorable	Favorable	More favorable	<ul style="list-style-type: none"> 740 BART Parking Spaces 0 Homes 0% Below Market Rate (BMR) Homes No Retail 	<ul style="list-style-type: none"> 370 BART Parking Spaces 730 Homes 20% BMR 365 Residential Parking Spaces (0.5 Spaces/Unit) 15,000 S.F. Retail 	<ul style="list-style-type: none"> 40 BART Parking Spaces 830 Homes 20% BMR 415 Residential Parking Spaces (0.5 Spaces/Unit) 15,000 S.F. Retail
Less favorable						
Favorable						
More favorable						

Policy Goal	Performance Measure for the Policy Goal	Performance of Existing Conditions	Performance of Scenario 1	Performance of Scenario 2
Complete Communities	More Land Uses	Provides one use (parking)	Multiple uses (retail, residential)	Multiple uses (retail, residential)
Complete Communities	Number of New Homes	0	730	830
Sustainable Communities	Fewer GHG Emissions, from TOD (Kg CO2/Day)	N/A	59.4% Less 6.17 Per Household 4,504 From TOD	6.17 Per Household 5,121 From TOD ⁱ
Sustainable Communities	Fewer GHG Emissions, Regionally (Kg CO2/Day)	0% Less 15.18 Per Household 12,599 Regionally ⁱⁱ 12,599 Total	1,518 Regionally ⁱⁱⁱ 6,922 Total	0 Regionally 5,121 Total
Ridership	Number of New BART Riders	0	1,350 ^{iv}	1,250
Value Creation / Value Capture	More Annual Revenue	\$2,986,248	\$4,070,526	\$4,776,005
Value Creation / Value Capture	Cost to Rebuild and/or Maintain Parking ^v	-\$15,569,600	-\$31,834,800	-\$3,441,600
Transportation Choice	Increase People Getting to the Station by Sustainable Modes ^{vi}	66%	73%	79%
Transportation Choice	Reduce Vehicle Miles Travelled, from TOD (VMT/Day)	N/A	81.1% Less 11.72 Per Household 8,556	81.1% Less 11.72 Per Household 9,728
Transportation Choice	Reduce Vehicle Miles Travelled, from TOD (VMT/Day)	0% Less 62 Per Household 51,460 Regionally ^{vii} 51,460 Total	6,200 Regionally ^{viii} 14,756 Total	0 Regionally 9,728 Total
Affordability and Equity	Number of BMR Home	0	146	166
Affordability and Equity	Increase % of BMR Homes Systemwide	0	2.09%	2.37% ^{ix}

ⁱ Although 5,121 kg CO₂/day is higher than 4,504 (Scenario 1), Scenario 1 actually contributes more GHG regionally and therefore has a higher total of 6,922 kg CO₂/day.

ⁱⁱ The opportunity cost of not building 830 homes at this location would very likely result in 830 households living in an average location in the region, releasing the average kg CO₂/day instead of 59.4% less.

ⁱⁱⁱ The opportunity cost of not building 100 additional homes at this location would very likely result in 100 households living in an average location in the region, releasing the average kg CO₂/day instead of 59.4% less.

^{iv} This represents net change from baseline only of riders who drive and park, and does not reflect changes in ridership from people who already access the station using sustainable modes. Scenario 1 results in only 100 more riders than Scenario 2.

^v For forty years.

^{vi} More people walk, bike, take transit and get dropped off to/from the station rather than drive and park, for home origin trips.

^{vii} The opportunity cost of the Existing Condition: not building 830 homes at this location would very likely result in 830 households living in an average location in the region driving the regional average instead of 81.1% less. The opportunity cost of Scenario 1: not building 100 additional homes at this location would very likely result in 100 households living in an average location in the region driving the regional average instead of 81.1% less.

^{viii} 146 and 166 BMR units represent 2.09% and 2.37%, respectively, of BART's 7,000 BMR unit goal.

In the future, a report similar to the one TransForm completed comparing two El Cerrito Plaza conceptual developments could be done for each station to guide decision-making, measure success, and maximize progress towards BART's TOD Policy Goals. That approach affords a deeper look at development potential at each site and helps to clarify tradeoffs between different scenarios.

Examining one policy goal highlights the differences between conceptual scenarios. For example Table 5 below looks specifically at how each scenario performs with vehicle miles traveled (VMT). VMT is one measurement used to evaluate Transportation Choice. At first glance it may seem that keeping the site a parking lot is better because no new development would create no new VMT associated with the new development. However, contextually it is by far the worst scenario for the region because of the *VMT associated with the opportunity cost of not building housing at a TOD location*. Assuming those additional households are not accommodated within TOD, they will live elsewhere, and their VMT impacts would reflect significantly higher regional averages. In other words, a no-build scenario would constitute a lost opportunity for BART to further their TOD Policy Goals.

Less TOD in the region would decrease transit mode share over time, increase demand for sprawl development and more freeway lanes, lengthen commutes to job centers, and worsen traffic and air quality. This highlights the benefits of TOD for the region at large, and how building as many homes as possible near transit can broadly improve quality of life, even for those who don't live in TOD.

Table 5: Performance of Scenarios at El Cerrito Plaza for Daily Vehicle Miles Traveled

	Existing Conditions	Scenario 1 50% Replacement Parking	Scenario 2 5% Replacement Parking
Reduction from average, per household	0%	81.1%	81.1%
Per household	62	11.72	11.72
From the site	Not available	8,556	8,556
Regionally	51,460	6,200	0
Total	51,460	14,756	9,728

This level of Comparative Analysis is effective in showing opportunity costs. If only the residential VMT created by the TOD is examined, it would appear on the surface that Scenarios 1 and 2 perform the same. Although land use is generally controlled locally, land use patterns such as where housing and jobs are located have regional implications.



IV. Methodology Applied to “Urban with Parking” Stations

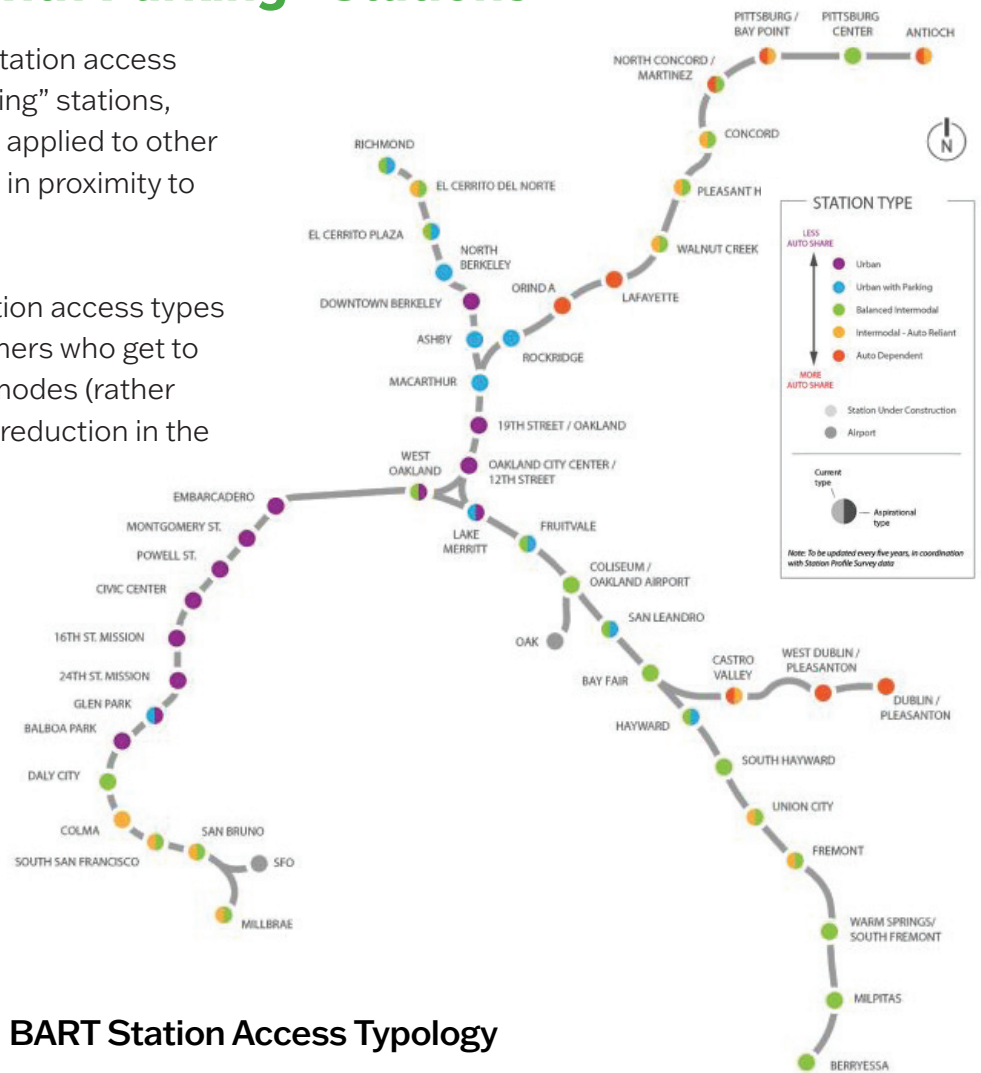
Focus on “Urban with Parking” Stations

This report is specific to BART’s station access typology and its “Urban with Parking” stations, but the recommendations can be applied to other transportation agencies with land in proximity to transit.

The main difference between station access types is the percentage of BART customers who get to the station by sustainable travel modes (rather than driving and parking) and the reduction in the share of people driving over time, from 2008 to 2015.

Station access types fall on a continuum from “less auto share” to “more auto share” — Urban, Urban with Parking, Balanced Intermodal, Intermodal—Auto Reliant, and Auto Dependent.

The map below shows where these station access typologies exist in the system.



BART Station Access Typology

Updated: 01/06/2021

³⁸ TransForm, *El Cerrito Plaza BART Station Development Scenarios*, February 2021

BART’s definition of “Urban with Parking” stations:

This station type has similar characteristics as “Urban” station type with the exception of parking and lower non-driving access rates. “Urban with Parking” stations have combined walk, bike, and transit access shares of approximately 50% to 75%. The availability of some parking translates into drive alone/carpool rates of 5% to 35%. The station can be often found in a neighborhood business or residential district or a district both businesses and residential.³⁹

BART, together with the jurisdictions, designated certain station access types as “aspirational,” with the intention to move them up the continuum as they are developed. Lake Merritt is aspirational “Urban” and El Cerrito Plaza is aspirational “Urban with Parking.” Of the stations evaluated in the report, North Berkeley, Ashby, and Rockridge are solidly defined as Urban with Parking, whereas Fruitvale and San Leandro are aspirational “Urban with Parking, and Glen Park is aspirational Urban.

Collective Performance of “Urban with Parking” Stations

This section shows what an aggressive build out of TOD can accomplish towards BART’s TOD Policy Goals. It summarizes the collective contributions of conceptual TOD at seven of BART’s “Urban with Parking” stations where future development could replace a high share of BART customer parking spaces. These stations include El Cerrito Plaza, North Berkeley, Ashby, Rockridge, Fruitvale, San Leandro, and Glen Park. **Table 6 below shows some of the basic design assumptions for each of the stations.**

Table 6: Inputs for Conceptual BART Stations: Units and BART Customer Parking

Station Name	Total Unit Count	Included BMR Units	Current Number of Parking Spaces	Estimated Replacement Parking	Number of Replaced Parking Spaces
El Cerrito Plaza	830	166	740	5%	40
N. Berkeley	1,119	559	756	30%	227
Ashby	755	377	541	15%	81
Rockridge	284	284	886	0%	0
Fruitvale	494	99	893	30%	268
San Leandro	1207	422	898	30%	269
Glen Park	128	128	53	0%	0

³⁹ Communication with BART staff updated previously published information, 2021.

Table 7: Collective Performance of BART “Urban with Parking” Stations

Policy Goal	Performance Measure	El Cerrito Plaza	North Berkeley	Ashby	Rockridge	Fruitvale	San Leandro	Glen Park	Cumulative Performance
Complete Communities	More Land Uses	Adds retail, residential	Adds retail, residential	Adds residential	Adds residential	Adds residential	Adds residential	Adds residential	Adds Retail & Residential
Complete Communities	Number of New Homes	830	1,119	755	284	494	1,207	128	4,837 Sum of New Homes
Sustainable Communities	Reduce Greenhouse Gas Emissions ⁴⁰	617 59.4% Less	4.81 71.7% Less	4.47 72.4% Less	5.33 671% Less	6.09 62.4% Less	7.17 57.8% Less	3.52 78.4% Less	5.37 Average 67.0% Less ⁴¹
Ridership	Number of New BART Riders	1,250	1,830	1,290	(350)	590	2,080	210	6,900 Total New Riders
Value Creation / Value Capture	More Annual Revenue	\$4,776,005	\$4,738,088	\$3,214,736	-\$418,001	\$265,00+ ⁴²	\$6,264,479	\$207,593	\$19,047,900 Sum of New Revenue
Value Creation / Value Capture	Cost to Rebuild and Maintain Parking	\$3,441,600	\$19,531,080	\$6,969,240	\$0	\$23,058,720	\$23,144,760	\$0	\$76,145,400 Sum of Cost ⁴³
Transportation Choice	Reduce Vehicle Miles Traveled ⁴⁴	11.72 81.1% Less	9.21 85.1% Less	8.57 86.2% Less	10.22 83.5% Less	11.66 81.2% Less	13.74 77.8% Less	6.43 89.6% Less	10.22 Average 83.5% Less ⁴⁵
Transportation Choice	Increase Use of Sustainable Modes to the Station ⁴⁶	79%	93%	96%	83%	88%	93%	95%	90% Average 14% More ⁴⁷
Affordability and Equity	Number of New BMR ⁴⁸ Homes	166	559	377	284	99	422	128	2,035 New BMR Homes
Affordability and Equity	Increase Percentage of BMR Homes ⁴⁹	2.37%	8.6%	5.4%	4.1%	1.4%	6.0%	1.8%	29.1% BMR System-wide

⁴⁰ kg CO2/household/day.

⁴¹ Less than the regional average.

⁴² Does not include ground lease and property tax estimates, therefore the net revenue will be higher than this.

⁴³ For forty years.

⁴⁴ Vehicle-miles traveled per household per day.

⁴⁵ Less than the regional average of 62 vehicle miles traveled per household per day.

⁴⁶ More people walk, bike, and take transit to/from the station rather than drive and park.

⁴⁷ 90% of riders using sustainable modes is 14% more compared to the current mode split.

⁴⁸ Below Market Rate. BART's goal is 7,000 BMR homes by 2040.

⁴⁹ 35 percent is BART's system-wide goal.

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TransForm conducted analysis of one conceptual development at each of the stations to show how the methodology could be applied and the results shown collectively. A complete report of each station's in-depth analysis is included in the Technical Appendix. The results for each performance measure at each station is depicted in Table 7 below.

These results show how BART is contributing to its overall system TOD Policy Goals.

The analysis quantifies results station by station, compared to other “Urban with Parking” stations, and collectively what they can deliver for both BART and the region.

- **These developments would create over 4,800 new homes—more than 2,000 of which would be affordable.** These stations would collectively contribute over 29 percent of the BMR homes systemwide for the BART system, edging closer to the 35 percent systemwide goal. The 4,800 new homes are approximately only 1 percent of what is needed by 2031 according to new RHNA targets.
- One of BART's priorities is to increase ridership, and this analysis shows that TOD at these stations will deliver an **estimated 6,900 new riders daily**.
- Additionally **over \$19 million in annual net revenue** would be expected to support BART operations.
- Collectively, **approximately 90% of people would travel to these stations by sustainable modes**, which is 14% more than the current mode split.
- The people who live in these future TOD homes would drive approximately 85 percent less than the regional average and release **67 percent fewer greenhouse gas emissions**.
- Although station by station it seems like a small percentage of parking is replaced, the estimated parking replacement and maintenance over forty years would total more than \$76 million.



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V. Sustainable Station Access Strategies



Building homes on existing parking lots is only one part of the process for BART to maximize the full potential of transit-oriented development on its property. Other steps are needed to mitigate for adverse impacts of parking removal, including impacts on station access and parking spillover into local neighborhoods. **BART must also invest in and collaborate with key partners to improve sustainable station access and implement robust parking management strategies.**

Station access refers to how people travel to and from BART stations. These modes of travel may include walking, biking, taking the bus, driving a motorcycle, driving alone or carpooling and parking, and getting dropped off (by a friend/family, taxi, or Transportation Network Companies [TNCs] such as Lyft or Uber).

BART's Station Access Policy, adopted in 2016, aims to support sustainability goals by minimizing solo driving, as well as enabling people to travel to and from BART stations "safely, comfortably, affordably, and cost-effectively." It lays out an investment framework for each station type. In order to discourage driving and encourage more sustainable modes of transportation to "Urban with Parking" stations, BART specified it will not invest in the construction of parking expansion. Rather, BART will prioritize investments in walking and biking, followed by investments for transit and shuttles, and will maintain and manage existing assets for taxis, TNCs, and drop off/pick up areas.

There are many strategies to encourage sustainable modes of transportation that BART and cities can implement. As part of this grant, ARUP investigated and laid out several strategies with broad estimates of their effectiveness to get people to change their travel behavior towards sustainable modes.

⁵⁰ BART Station Access Policy, Adopted June 9, 2016.

⁵¹ ARUP, Technical Memo: El Cerrito Plaza BART Patron Parking and Access Analysis for Future Station TOD, 2019, p.14.

ARUP highlights two critical steps that must be taken to mitigate the need for parking replacement at El Cerrito Plaza Station.

- The first step is to support alternative access modes as detailed below.
- The second is to price parking to reflect its market value and enable customers to make more efficient decisions about station access — ideally choosing more sustainable modes.⁵¹

BART and TransForm discussed sustainable station access strategies during a workshop held in January 2021 for more than 20 BART TOD stakeholders, also as part of this grant. Their feedback is incorporated below.

Results of Station Access Analysis

Investing in sustainable access while implementing better parking management can effectively encourage mode shift away from driving.

Based on ARUP's survey of El Cerrito Plaza Station patrons, one third of those who currently drive to El Cerrito Plaza Station already park off BART property, on neighborhood streets. Over 80 percent of respondents said they were willing to pay for a monthly or annual pass that would allow them to park in the neighborhood (within a 5-minute walk from the station).⁵² Thus, in addition to considering market-driven pricing for replacement parking on BART property, the agency may also consider partnering with the city to improve the management of existing parking resources in proximity to the station. This includes better management of on-street parking, exploring shared parking arrangements, and instituting other programs that maximize the use of existing parking assets.

The amount of BART parking that is rebuilt is the most significant factor in changing behavior, and station access investments are more effective when parking availability is lower. Several stakeholders at the January 2021 workshop agreed that a reduction in parking would motivate people to try alternative ways of getting to the station.

The following information is based on an initial high-level assessment that will be further evaluated in upcoming access studies and discussed with partner agencies, mobility providers, and community



Federica Armstrong/TransForm

⁵² ARUP Station Access Survey, p.3.

members. This is especially necessary since **most of the improvements listed below are outside of BART’s jurisdiction and would need to be implemented by other agencies and service providers.** Additionally, funding would need to be identified to implement the strategies.

ARUP estimates that access investments can lead to up to seven percent in mode shift, meaning that seven percent of people who currently drive and park would switch to a sustainable way of travelling to the station. The more strategies used, the higher the shift. Potential station access strategies are listed below in order of effectiveness: Low = 0.5-2%, Moderate = 2-4%, High = 4-7%.⁵³

Table 8: Effectiveness of Sustainable Station Access Strategies⁵⁴

Sustainable Access Strategy	Level of Effectiveness
Bike network improvements	High
Bike Station	High
Off-site, near-term bike infrastructure improvements	Moderate
Off-site, near-term pedestrian infrastructure improvements	Moderate
Secure bike parking	Low
Existing bus route improvements	Low
Circulating shuttle	Low
Wayfinding signage	Low
Subsidize priority spaces for dynamic carpooling	Low
Coordinated fare payments across operators	Low
Gamification	Low

ARUP considers a basic approach to include the first four strategies listed above — more than that would be an enhanced approach.⁵⁵ Some stakeholders emphasized the importance of having multiple viable options, because not every mode is suitable for everyone.

Bike network improvements, one of the highly effective strategies listed above, refers to connecting networks that people with a variety of preferences and needs can use.

Safe and comfortable bike routes that connect neighborhoods and destinations, and tie in with transit stations, best serve people who bike.⁵⁶ Bike routes include different types of infrastructure including paths, bike lanes, separated or protected bike lanes and low-stress local streets.⁵⁷

Bike stations, the other highly effective strategy, refers to a hub for people who ride bicycles to a transit station. A bike station can offer a variety of services such as free valet parking, controlled-access parking, bicycle repairs and rentals, products to purchase such as helmets and lights, and classes. BART already has six full-service bike stations.⁵⁸ Related but not as amenity-rich is secure

⁵³ ARUP, Technical Memo: El Cerrito Plaza BART Patron Parking and Access Analysis for Future Station TOD, 2019, p.6.

⁵⁴ ARUP, Technical Memo: El Cerrito Plaza BART Patron Parking and Access Analysis for Future Station TOD, 2019.

⁵⁵ ARUP, Technical Memo: El Cerrito Plaza BART Patron Parking and Access Analysis for Future Station TOD, 2019.

⁵⁶ FTA, Manual on Pedestrian and Bicycle Connections to Transit, FTA Report No. 0111, prepared by the Transportation Research & Education Center (TREC) at Portland State University, August 2017, p. 18.

⁵⁷ FTA, p. 51.

The Emery Go-Round is a circulating shuttle that serves the MacArthur BART Station and the City of Emeryville. Palden Ukyab/TransForm



bike parking. Stakeholders confirmed that weather-protected and secure bike parking is critical to encouraging bike access to BART stations. They also pointed out that bike parking should accommodate many types of bikes, including electric and cargo bikes.

Off-site, near-term pedestrian and bicycle infrastructure improvements, which are moderately effective at mode shift, may include lane reconfigurations known as channelization, signals and lights, passive signs, and audible cues.⁵⁹ For people walking to the station, improved pedestrian access includes infrastructure improvements such as high-quality and accessible sidewalks, short

blocks, short crossing distances, and multiple crossing opportunities — especially at transit stops.⁶⁰ Lighting is another improvement that can help people feel more comfortable and safe when walking and biking to and from a station. Lighting came up as a priority in BART's surveys, outreach, and the stakeholder workshop.

For people biking to the station, improved bicycle access includes infrastructure improvements to network connections and wayfinding to direct people towards the station and its bicycle parking facilities. Once in the station, making it easier for people with bikes to get up or down to the train on stairways and elevators, being able to get through fare gates, and the ability to make a quick fix at a repair station are also examples of infrastructure improvements.⁶¹

The U.S. Department of Transportation has said that “every transportation agency... has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems.”⁶² BART's focus on bicycle and pedestrian access at Urban with Parking stations is in line with this federal guidance, and also serves to advance its TOD goals around mode shift and sustainable station access.

Improving bus routes and having a circulating shuttle, which are on ARUP's list, were also mentioned by some stakeholders during the workshop. In order for more people to switch to taking a bus to BART, bus access needs to be efficient and included in BART TOD site design. It also needs to be reliable and convenient for customers. For example, stakeholders pointed out that when it comes to the proximity of a bus stop to BART's fare gates, the distance of even 50 or 100 feet can make a big difference for people hurrying to catch a train or bus.

⁵⁸ FTA, p. 60.

⁵⁹ FTA, p. 41.

⁶⁰ FTA, p. 45.

⁶¹ FTA, p. 51.

⁶² USDOT, Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, 2010.



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VI. Lessons Learned from Community Engagement

If BART is to meet its ambitious TOD policy goals, it will need community support for development plans that maximize housing and minimize parking. Authentic community engagement is essential to build community support, which is in turn crucial to build support among elected and appointed city officials. The lessons learned from community engagement around BART's Lake Merritt and El Cerrito Plaza TOD projects can be applied to efforts to engage the community in support of TOD projects at other BART stations. These lessons include the following:

1. Start community engagement and listening as early as possible in the process.
2. Offer a range of different types of community engagement opportunities to increase participation.
3. Partner with established community organizations and leaders to build trust. Incorporate expressed community needs and desires into development plans as much as possible.
4. Incorporate expressed community needs and desires into development plans as much as possible.
5. Anticipate increased resistance to reduced replacement parking as station access types become increasingly more auto-dependent.
6. Proactively address any concerns and demonstrate positive tradeoffs for the community around limiting replacement parking.

Understanding the local context from which these lessons were drawn will support effective application of them in building support for BART TOD projects at additional BART stations.

Work Conducted as Part of this Project

At Lake Merritt, TransForm's community engagement consisted of three workshops and ten stakeholder conversations. TransForm hosted a table on station access and parking within a larger workshop focused on the other aspects of the proposed development. Findings from these were shared with the developers and BART.

TransForm's technical analysis included a white paper on multifamily parking, a GreenTRIP Certification evaluation of TDMs and proposed parking supply for all multifamily buildings proposed on the site, and a matrix of funding sources for transportation infrastructure and their respective requirements that could be used not only at this site but also other Alameda County and Oakland sites.



At El Cerrito Plaza, TransForm's community engagement consisted of helping conduct the BART customer intercept survey, coordinating an Open House for the future development, and conducting individual stakeholder interviews. TransForm synthesized findings from these activities and shared them with BART.

Lessons from Lake Merritt

Offering a range of community engagement opportunities throughout the development process leads to increased community participation. When community members are involved and feel heard, they are more likely to support a project.

Community engagement opportunities around Lake Merritt and Chinatown began before BART introduced the Lake Merritt TOD project to the public, and included the following:

- Extensive community engagement, including a community survey by the Chinatown Coalition and Chinatown Chamber of Commerce, as part of the City of Oakland's Lake Merritt Station Area Plan (LMSAP) process (2009 - 2014).

- Three stakeholder meetings held by BART between December 2017 and February 2018, prior to releasing the Lake Merritt TOD Request for Qualifications (RFQ).

After BART selected a developer team for Lake Merritt TOD, TransForm collaborated on community engagement with BART and its developers, East Bay Asian Local Development Corporation (EBALDC) and Strada Investment Group. TransForm’s knowledge of residential parking and experience in talking to people about their transportation needs was useful in strategizing how to frame conversations around parking and station access to thoughtfully engage community members. The groups collaborated in the following activities.

- **A workshop** TransForm led in April 2019 as part of the **American Planning Association’s National Conference**.
- An **open house-style workshop** EBALDC held for the Chinatown community in January 2020. During the open house, TransForm asked community members how they got around the neighborhood and their thoughts on parking in an effort to collect data to inform the developers’ transportation demand management (TDM) program. Victoria Eisen, a consultant, spoke with community members about BART station access. Strada, EBALDC, and BART made presentations and asked community members for input on various aspects of the project.
- A **virtual workshop** TransForm and EBALDC hosted for the community under COVID-19 Shelter-in-Place restrictions in October 2020, to present the design of an open space called the “paseo” and for community members to prioritize ideas that came out of the second workshop to improve station access.
- Ten **one-on-one conversations** with representatives of institutional community stakeholders.
- An **online survey** for community members who were unable to attend the October 2020 online workshop. This also allowed the collection of feedback for an extended period of time.
- A **paper survey** similar to the online survey, in order to reach community members who are not online, especially in Oakland Chinatown.

TransForm’s support of EBALDC’s engagement efforts provided additional opportunities for and increased level of community and stakeholder engagement. Increased engagement allowed TransForm and the development team to gather more data to inform



the Lake Merritt TOD TDM program and station access priorities, better address the community’s needs and desires, and build greater community support for the project.

Early engagement works both ways. The community’s needs and desires are better understood by BART and the developers, and the benefits of a TOD proposal meeting BART’s policy goals are better understood by the community. **Communication and understanding build community support for a responsive TOD proposal.**

BART’s first attempt to redevelop the Lake Merritt station stalled due to community opposition after BART had selected a developer and put forth a proposal. After that, a Specific Plan process was initiated for the roughly half-mile radius around the Lake Merritt BART station in downtown Oakland. In December 2014, the City of Oakland released the Lake Merritt Station

Area Plan (LMSAP). The plan was developed with extensive community input and close consideration of local and regional TOD goals, including BART’s TOD policy goals. The plan reflects the desires and aspirations of a wide range of community members, stakeholders, City staff, the Planning Commission, and City Council.

Throughout the long LMSAP process, the **East Bay Asian Local Development Corporation (EBALDC)** played a significant role in facilitating community engagement as part of the **Oakland Chinatown Coalition**. The Coalition also includes **Asian Health Services, Asian Pacific Environmental Network, and twenty other neighborhood organizations**, churches, businesses, and individuals. The Coalition partnered with the **Chinatown Chamber of Commerce** to survey more than 1,000 residents and businesses about their needs and desires for their neighborhood. They solicited input from a wide range of community members and groups, including those that might typically be opposed to affordable housing (e.g. Chinatown Chamber of Commerce) or large scale development (e.g. **Oakland Heritage Alliance**).

In the Spring of 2018, BART released an RFQ for a second take at a Lake Merritt TOD, and together with the selected developers presented a proposal informed by the LMSAP guidelines to the community. This second proposal, which includes a high percentage of BMR housing units (55 percent) and no replacement parking for BART customers, has gained the support of the community.

Partnering with established community organizations and leaders builds trust. Communities are more likely to support developers they trust.



When BART selected East Bay Asian Local Development Corporation (EBALDC) as their community developer partner for the Lake Merritt TOD project, they selected a partner with a long history and established leaders in the community. EBALDC was founded in Oakland's Chinatown in 1975. Ener Chiu, EBALDC's Assistant Director of Real Estate Development, is a member of the Oakland Chinatown Coalition, and was a member of the Community Stakeholders Group and Technical Advisory Committee for the LMSAP. Annie Ledbury, Senior Manager of Creative Community Development, is an EBALDC employee dedicated full-time to community engagement. Such a staff role is rare for developers, and of enormous benefit to building community support.

The Chinatown community trusts that EBALDC has the community's best interests at heart. At this point in the development process of the Lake Merritt TOD, the community generally supports the project. The developers have received only a few comments from community members displeased with the project program, and do not expect to encounter strong community opposition as the project moves forward.

The community engagement and entitlement processes for the Lake Merritt TOD are overlapping and non-linear, which has resulted in the delay of incorporating some points of community input into the development plans available to the public. At any point in the entitlement process, opposition to the Lake Merritt TOD project could come forward, particularly at high profile events such as Planning Commission hearings. Large projects with increased density and reduced parking are often met with opposition by a vocal minority. However, the breadth and depth of the Oakland Chinatown community's engagement, which led to a clear understanding of the communities needs and desires, coupled with the inclusion of a trusted community organization on the development team, give every reason to believe that BART's Lake Merritt TOD proposal will continue to receive the support of the community throughout the entitlement process.

Lessons from El Cerrito Plaza

Managing the source and timing of messaging and information influences the tone and focus of community input.

The City of El Cerrito's leaders and community have shown strong support for sustainability and development in many ways, long before BART released its RFQ for the El Cerrito Plaza TOD in the Summer of 2020. In December of 2014, the City of El Cerrito adopted the **San Pablo Avenue Specific Plan**, which sets the tallest height limits on BART property at El Cerrito Plaza and El Cerrito del Norte stations. In 2016, during BART's station access policy development process, **the City requested the El Cerrito Plaza station be reclassified from the "Balanced Intermodal" to the more aspirational "Urban with Parking" BART access type**. And, in the Summer of 2017, the City adopted their first innovative Affordable Housing Strategy. Yet, even with this groundwork in place, comments at the first open house event for BART's El Cerrito Plaza station TOD skewed toward concerns about potential loss of replacement parking.

BART and TransForm facilitated several community engagement efforts supported by this grant, before the development team was selected. Efforts included the following:

- BART passenger survey about how people access the station,
- In-station outreach events,
- An open house,
- Individual stakeholder interviews conducted online due to COVID-19 Shelter-in-Place restrictions.

At the open house held in October 2019, BART presented their general TOD policy goals, specific El Cerrito Plaza Station TOD goals and objectives, and potential future development ideas. Prior to the open house, an unknown entity left flyers with misleading information regarding future development, particularly the potential loss of parking, on cars parked at





the station. Community members gave input on improving station access, housing, and community amenities and creating a vibrant city center and potential new library. Yet, overall the comments skewed toward BART patrons upset about the potential loss of parking. **For BART TOD stakeholders, this underscores the importance of communicating high-quality, accurate information early and often.**⁶³

During the Summer of 2020, TransForm conducted one-on-one stakeholder interviews with three El Cerrito City Councilmembers, including the current mayor and a recent Planning Commissioner,

to learn what they were hearing from their constituents and generally where those constituents live. The goal of these interviews was to identify communication gaps and solicit suggestions for more effective communication about the project with the community in the future. The stakeholders made the following main points during the interviews:

- Outreach with the goal of building community support is more effective when communication comes from people and organizations who have established, trusted relationships in the community.
- Community support for housing density is best demonstrated when local leaders hear from a variety of groups and constituents.
- Community members are more likely to accept reduced replacement parking when they understand solutions available to offset the reduction and benefits of new community amenities.
- Community members need to understand the tradeoffs between different development scenarios, such as what amenities or benefits are not possible if BART and residential parking are prioritized.
- Community members are more likely to accept new or higher parking fees if the City can specifically indicate for what use the revenue will be targeted.
- BART and the City should not assume that the community input received during the open house reflects the opinions of the majority of community members.

The first point—the role trusted relationships play in development—is of particular note as trusted relationships were critical in building community support for the Lake Merritt Station TOD proposal. In November 2020, BART selected its development team for the El Cerrito

⁶³ BART TOD stakeholder workshop feedback, January 2021.

Plaza TOD—Holliday Development, Related California, and Satellite Affordable Housing Associates (SAHA). The development team, particularly SAHA, can now leverage their established, trusted relationships within the community in shifting the focus of conversation from the potential loss of parking to the tradeoffs between BART parking and community amenities in future community engagement events to build support for the El Cerrito Plaza Station TOD proposal.

The unique conditions in any station’s surrounding area should inform expectations for community support for reduced replacement parking.

Although the community input during the first open house may have been skewed by misleading information outside of BART’s control, the issue of parking will likely be a concern for the El Cerrito Plaza community for two reasons—walkability and transit access. While the area around the El Cerrito Plaza station is more walkable than the area around many other BART stations, many of the area residents live uphill from the station, making for a strenuous walk home. Additionally, the station serves many low- and moderate-income commuters living in El Cerrito north of the station and in Richmond, who currently rely on BART parking to access public transit. The introduction of a library on the site that would serve the entire community of El Cerrito will further complicate the issue of parking.

The communities surrounding and served by the El Cerrito Plaza station have concerns about the potential loss of parking. Future community engagement opportunities would do well to highlight alternative solutions to on-site parking such as a last-mile shuttle, increased pedestrian safety and secure bike parking, improvements to the Ohlone Greenway, expanded access to services such as a day care center and a library, and strategic management of parking spaces. Building community support will require building understanding with the local community and BART patrons around parking related issues, and honesty and authenticity about BART’s policies and plans are critical.⁶⁴ Key to the success of future outreach efforts will be communicating the balance of transit access, community amenities, and parking.

Applying the Lessons to Future BART TOD Projects

Each community is unique; a development proposal informed by the community’s needs and desires and the opportunities and constraints of the area surrounding the station can lead to greater community support of the proposal.

What could BART realistically replicate in building community support for development with right-sized parking at their other stations? One tactic is to identify if the local jurisdiction has conducted outreach to the community about the potential for development, and if any housing policy, specific plan, or zoning regulations exist that support BART’s TOD goals and objectives for that particular station location. If a specific plan is in place, it is important to know if a programmatic Environmental Impact Report has been completed. BART included this tactic

⁶⁴ BART TOD stakeholder workshop feedback, January 2021.

in the formulation of their TOD Work Plan. “Local Support for TOD” is one criterion used to prioritize particular stations for development. Both the Lake Merritt and El Cerrito Plaza TOD projects are located in areas with local policies, plans, and regulations in place that support BART’s TOD goals and objectives. A proposal with no replacement parking for the Lake Merritt TOD has been presented to the community and is generally supported by the community. BART’s TOD goals and objectives for the El Cerrito Plaza TOD have been presented to the community and the potential for reduced replacement parking is currently a point of contention from the community. **Replacement parking is generally the largest barrier to TOD on transit agency property.**

It is important to note that the BART TOD Guidelines classify the Lake Merritt station as “Urban with Parking” aspiring to “Urban” and the El Cerrito Plaza station as “Balanced Intermodal” aspiring to “Urban with Parking.” The respective communities access the two stations differently for reasons related to the surrounding locale and its level of urbanization. It stands to reason that TOD proposals for stations located in increasingly less urban locales will experience increasing levels of community resistance as the level of replacement parking is further reduced. However, these shifts are worthwhile and necessary to address the region’s housing and transportation challenges and achieve BART’s goals — political deftness informed by deep community engagement will be key to success. Take note: like the El Cerrito Plaza station, the Fruitvale and San Leandro stations are classified as “Intermodal Balanced” aspiring to “Urban with Parking.”

Developers come in all shapes and sizes; building a team that values genuine connection to the community can lead to greater community engagement and support of the development proposal.

What could BART realistically replicate in building community support for TOD development in general at other stations? BART should continue to give scoring credit in the RFQ process





to development teams that include mission-driven developers and community development corporations with a history of working in the community surrounding the station. This made a positive impact in the Lake Merritt project earning a high level of community support, and it weighed into the selection of the development team for El Cerrito Plaza. An extra bonus could be applied to community development corporations that also provide resident services such as EBALDC, Chinatown Community Development Center, Mission Economic Development Agency, and, to a lesser degree, Resources for Community Development, and Satellite Affordable Housing Associates (SAHA).

BART cannot control whether a mission-driven developer or a community development corporation works in the community surrounding a station, nor whether they submit a proposal, but they can and do place value on this attribute in their scoring process for developer applications. Mission-driven developers generally don't

have as much capacity for or experience with developing high-density, mixed-use TODs as commercial developers do, so the pattern of them partnering with larger commercial developers as a development team (as is the case with the Lake Merritt and El Cerrito Plaza TOD projects) will likely continue.

Having developers with strong community engagement practices would help ensure accurate communication about the TOD occurs early and often, and through a variety of channels. Several stakeholders at the January 2021 workshop conducted as part of this grant confirmed the importance of frequent, varied community outreach.

This grant provided more opportunities and a higher level of community engagement to date than would have otherwise been possible for the Lake Merritt and El Cerrito Plaza TODs. All stakeholders can learn from these valuable examples and benefit from the relationships strengthened in the process. The lessons learned in implementing this grant and as outlined above can inform efficient and effective community engagement efforts toward building the community support critically needed if BART is to achieve its TOD goals and objectives and maximize the development potential of its property. **Other public agencies with developable land near transit can also learn from these lessons.**



VII. Conclusion and Recommendations

The year 2020, when much of the work for this project was completed, made the urgency of BART's TOD Policy Goals painfully clear. The COVID-19 pandemic underscored the link between housing, health, and safety. Stable housing is the cornerstone of well-being for both individuals and communities. At the same time, catastrophic wildfires and six weeks of smoke-filled skies were a wake up call that climate change is negatively impacting the lives of all Bay Area residents today.

How and where we build housing must change if we are to adequately address the urgent interrelated crises of housing and climate change. BART has an important role to play as part of the solution to these problems. The Bay Area needs more homes near high-quality transit and jobs to make living here more affordable and sustainable, and to reduce demand for new suburban sprawl development.

Housing near public transit is convenient and desirable for most urban residents. It further supports people who do not drive, including those with mobility challenges, who are too young or old to drive, or who cannot afford a car or prefer not to own one. More housing on BART land provides more people with stable homes in connected communities. **Easy access to mobility gives people a better chance to succeed in school, participate in the economy, and live close to their families and social networks. When one thrives, we all thrive.**

Recommendations

TransForm offers the following recommendations to support the successful development of transit-oriented development on BART property. The recommendations can also be helpful to other public agencies with developable land near high-quality transit. While most of the

recommendations are for BART, it is also crucial for cities and neighbors to work with BART to make transit-oriented development a reality, protect vulnerable residents from displacement, and ensure the many community benefits of TOD are shared equitably within communities.

Methodology

This report builds on BART's adopted TOD Performance Targets and Measures, proposing a way to put many of them into practice for the first time. Operationalizing BART's targets and measures — establishing metrics to calculate them consistently, as in this report — is a critical step to evaluate how well conceptual developments meet BART's ambitious TOD Policy Goals. Such a system would help BART make decisions about development scenarios at all the stations with developable land for homes and explain those decisions to stakeholders.

BART should use the methodology proposed in this report, or develop a similar one, to measure success towards its TOD goals. BART has already adopted most of the Performance Measures used in the methodology, and this report describes and implements metrics to calculate many of them. Other agencies with developable land near high-quality transit could use similar measures and methodology to evaluate their own potential TOD.

BART could apply a consistent set of metrics and methodology for evaluating competing development scenarios at its stations. A clear standard for measuring how a conceptual development progresses BART's goals sets guidelines and expectations for developers during the bid process, and allows for clear comparison and understanding of trade-offs when selecting one proposal over another. A documented approach that can be replicated also supports institutional continuity even when there are changes in staffing.

As mentioned in the Methodology section above, BART should continue to reflect and improve upon this methodology, including by updating or adding performance measures as it refines its approach to evaluation. Future iterations could include more aspects of TOD, especially commercial components such as estimating induced VMT from commercial uses and opportunities to support disadvantaged and small businesses.

More Homes, Less Parking Achieves TOD Policy Goals

BART should prioritize housing production, especially affordable housing, over parking and other goals when making decisions between different development scenarios.

More housing near transit not only provides desperately needed homes in the region but is also an effective climate change mitigation strategy, especially when affordable homes are included.

BART will likely not be able to achieve its goal of 20,000 new homes and 7,000 affordable homes if it consistently prioritizes other policy goals. BART acknowledged in its August 2020 Draft TOD Work Plan that it currently “falls short of its residential production targets, with the greatest deficit in affordable housing.” BART has a 2025 Performance Target of 2,450 new affordable homes on their properties. Currently, 1,840 affordable homes are under negotiation, under construction or completed.⁶⁵ That underscores the importance of maximizing affordable homes on BART’s remaining developable land.

Take El Cerrito Plaza development scenarios as an example — the scenario with the least replacement parking might attract 100 fewer daily BART riders, but makes it possible to build 100 more homes. While the number 100 happens to be the same, this represents a marginal impact on overall ridership versus a much more significant impact for housing production and its social, commercial, and environmental benefits.

Furthermore, investing in parking is inconsistent with BART’s Station Access Policy for Urban with Parking Stations.

Under BART’s Investment Framework for Urban with Parking Stations, car parking is “Not Encouraged: BART will not invest in construction of parking expansion.”⁶⁶ With clear sustainability, housing and financial benefits accruing to scenarios that minimize replacement parking, BART should choose development scenarios that capture as much value as possible.

The TOD Policy Goal of Value Creation and Value Capture aims to “enhance the stability of BART’s financial base by capturing the value of transit, and reinvesting in the program to maximize TOD goals.” As demonstrated in the comparison of development scenarios for El Cerrito Plaza, **the scenario with the least parking generated the most net revenue and incurred the least costs.**



*The Ohlone Greenway multi-use trail near the El Cerrito Plaza BART Station
Ann Cheng/TransForm*

⁶⁵ BART TOD Workplan, August 2020 Draft.

⁶⁶ BART Station Access Policy, Figure 2, 2016, p. 4.

Building more replacement parking would also carry a high opportunity cost, using financial resources that could otherwise be allocated to operations, system repairs, new BART cars, or infrastructure improvements to make it more safe and convenient for people to walk and bike to the station.

Residents of TOD sites use public transit more than residents of non-TOD sites, and lower income households drive less and use transit more regardless of whether they live in a TOD or not. TransForm’s research has shown that when low-income households live within a quarter mile of frequent transit, they will drive up to 50 percent less than higher income households. Higher income households drive more than twice as many miles and own more than twice as many vehicles as Extremely Low-Income households living within a quarter mile of frequent transit.⁶⁷

Recent research conducted by UC Berkeley suggests these trends may differ somewhat for BART, as opposed to high-frequency public transit generally, due to the higher cost of BART fares and that BART was less likely to reach working class job sites. However, the research did conclude that residents of affordable housing near BART were more likely to use BART for non-work trips and at off-peak hours. It also found residents of affordable housing near BART average fewer than one vehicle per household — and were the only survey group with such low vehicle ownership. Therefore low-income households without cars or with limited access to cars had greater access to services, amenities, community and jobs because BART was an option.⁶⁸

The findings suggest that providing free or subsidized transit passes to residents of affordable housing near BART would significantly increase their BART ridership. BART’s new TDM Program reflects this opportunity — “Free or Subsidized Clipper Card Cash” and “High Value BART Pass Equivalent” are options in their TDM Strategy Toolkit, from which developers must select.⁶⁹

For environmental as well as social and economic reasons, BART should prioritize low-income families’ ability to afford to live in TOD. Affordable housing in TOD reduces VMT and GHG emissions more than market rate housing, as well as providing greater access to opportunity, services and amenities for these low-income households.

It’s also important to take into consideration the opportunity cost of GHG emissions and VMT associated with not building housing at TOD locations. If additional households are not accommodated in TOD, their driving and GHG impacts will likely reflect the higher regional averages. That would be a lost opportunity for BART to contribute further to their TOD Policy

⁶⁵ TransForm, California Housing Partnership Corporation, *Why Creating and Preserving Affordable Homes Near Transit is a Highly Effective Climate Protection Strategy*, 2014.

⁶⁶ Barajas, Jesus. Frick, Karen. Cervero, Robert. *Travel of TOD Residents in the San Francisco Bay Area: Examining the Impact of Affordable Housing* 2020.

⁶⁷ BART, TOD TDM Program, Draft, August 2020.

Goals and for the region overall because everyone would suffer from poorer air quality and worsening climate change.

Parking utilization data for BART station place types shows residential parking near TOD has been overbuilt. With thoughtful and serious TDM strategies, residential parking demand at new TOD can drop dramatically.

There are many options to encourage people to choose different ways of getting to and from the station. Neighbors have preferences for what types of infrastructure investments could improve their experience, and these will differ from place to place as the local travel behavior varies. **Community members should have the opportunity to review and comment on synthesized initial input and confirm or clarify what they consider priorities.**

These recommendations are consistent with BART's forward-thinking TOD and Station Access policy goals. **Other transit agencies that do not already have comparable goals in place should establish their own policies to ensure TOD is affordable and designed to enable residents to drive less.** One place to begin is by establishing station place types, eliminating parking minimums, and setting parking maximums for TOD on their properties. BART's policy specifies no parking minimums, parking maximums ranging from 0.375 to 1.0 depending on place type, unbundled parking, and one secure bicycle parking space per residential unit.⁷⁰

Strategic Community Engagement

Agencies and developers should start early, leverage trusted relationships, and employ a range of tactics when doing community engagement for TOD. Residents are more likely to understand and support less replacement parking at BART if they first understand the benefits for climate, affordability, and community amenities that spending less on parking can make possible. The details and logistics of parking replacement can follow after. These recommendations will enable more effective communication, build community support for projects, and offer a wider swath of community members opportunities to give input. Soliciting a balance and variety of input for developers and cities should result in better TOD projects.

An intercept survey should be conducted at transit stations where TOD will be built, with awareness of limitations due to COVID-19. The intercept survey at El Cerrito Plaza provided an updated snapshot of how people get to the station and their stated preferences, and was helpful information to share during outreach to community members. The intercept survey provided an opportunity to ask about travel patterns and reasons for them, and to ask BART customers directly what they would do if parking was reduced or eliminated. When funding is available, it would be helpful to complete this for the other BART stations.

⁷⁰ BART TOD Guidelines, 2017, p. 16.

However, the COVID-19 pandemic complicates intercept surveys for multiple reasons. First of all, it is more risky and difficult to approach people and ask them to take a survey, and many will be less likely to agree to do so. Additionally, the pandemic has drastically shifted commuting patterns and the habits and demographics of BART riders. Intercept surveys conducted in 2021, and perhaps even for some time beyond that, may not accurately represent past or future rider behavior. Intercept surveys are still worth conducting, but adjustments should be made to the methods of survey collection, the questions asked, and the weight given to the results in light of the pandemic. Continued use of the 2015 Station Access surveys will also be important reference points until travel behavior stabilizes after the pandemic.



Community feedback should inform which station access strategies are prioritized at TOD, though decision-makers should also keep in mind that participants in the public engagement process may not represent the entire community.

This underscores the need for robust, multi-faceted community engagement activities that draw in diverse people and opinions. Providing food, child care, and live translation at multiple events would help increase turnout among working families, lower income neighbors, and immigrant communities that are often underrepresented in such processes.

BART should continue to give scoring credit in the RFQ process to development teams that include mission-driven developers with a history of working in that neighborhood. This made a positive impact in the Lake Merritt project earning a high level of community support, and it weighed into the selection of the development team for El Cerrito Plaza.

The Role of Cities and Other Stakeholders

Cities, BART neighbors, and other relevant public agencies have important roles to play in the successful development of transit-oriented development. Indeed, these partners and stakeholders have been key players in many aspects of this project that have already been discussed. There are two areas, however, where BART currently has little or no decision-

Family outside Coliseum Connections Apartments at the Oakland Coliseum BART Station
Maria Avila/BART



making authority and other stakeholders must step up for TOD to reach its full potential to benefit a community.

As discussed in the introduction, local governments and concerned citizens must take proactive action to minimize harm and maximize the benefits of new TOD for vulnerable neighbors.

In order for communities to grow equitably and thrive, cities must adopt policies to protect vulnerable residents from displacement as new development and amenities increase local property values. Concerned residents who want to see more homes in their communities should advocate to protect vulnerable neighbors at the same time. Such policies include Just Cause eviction ordinances; anti-harassment policies prohibiting landlords from forcing tenants

out by neglecting maintenance, through intimidation, or with buy-out offers; and right of first refusal, relocation assistance, and “right to return” policies.⁷¹ These policies should ideally be put in place before development of BART land begins. While such policies are outside BART’s jurisdiction to impose, BART should encourage cities and neighbors to support such safeguards for new TOD and work with organizations like TransForm to make these policies a reality.

City partners also have greater jurisdiction and responsibility when it comes to station access improvements and parking management strategies in the surrounding neighborhood. As discussed in detail in Section V of this report, it is critical for cities and other relevant agencies to partner with BART to enable more sustainable station access choices and efficiently price and manage parking supply. Supporting BART’s station access goals in this way is in the best interest of these stakeholders, as it will help integrate and connect new TOD to its neighborhood and ensure the benefits are widely shared and enjoyed in the community.

⁷¹ Causa Justa :: Just Cause, *Development without Displacement*, p.57.

In conclusion, BART is at the leading edge of a paradigm shift that is necessary to make across American cities — to build more homes near transit and jobs that are accessible to and inclusive of vulnerable and historically marginalized community members. This shift is vital to create just, healthy, connected communities that can stop contributing to climate change.

BART's TOD Policy Goals and Station Access Goals lead in the right direction for the long term, but such a shift is not easy to make. Some stakeholders will always be resistant to change. BART and its city and neighborhood partners must strike a delicate balance between leading and listening. They must understand and respond to community concerns, engage in genuine dialogue, and fully explain the benefits of a different approach.

This project, this report, and these recommendations should help BART chart a course to making its goals reality — and in the process, to raise awareness about and support for the need for an evolution in how and where new homes are built.

Measuring the Promise of Transit-Oriented Development:

A Proposed Methodology for BART

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BART Board of Directors: Transi-Oriented Development Policy Performance Measures and Targets

Adopted December 1, 2016

POLICY GOAL	INTENT	STANDARDS FOR TOD ON BART LAND				STATION AREA GOALS	
		#	Draft Performance Measures	Baseline	2025 Target	2040 Target	2040 Target Unit of Measurement
A. Complete Communities	District Vitality and Growth	A1.	Residential Units to be produced on BART property	2,397	7,000	20,000	84% Increase in Housing Units within 1/2 mile of BART stations from 2010 to 2040 ¹ (155,800 new units)
		A2.	Office/Commercial Square Feet to be produced on BART property	208,682	1,000,000	4,500,000	53% Increase in Jobs within 1/2 mile of BART stations, 2010-2040 (277,500 new jobs) ¹
		A3.	Minimum net density threshold for units on BART property		Min 75 DU/Acre		
		A4.	# Station areas (1/2 mile) more than 1 mile from grocery store	9	7	0	85 Average Walkscore® for BART Stations (2016 Average: 75)
B. Sustainable Communities Strategy	Plan Bay Area (PBA) Implementation & Regional Quality of Life	B1.	% Units on BART Property supporting Station Area goal of 155,800 new units within 1/2 mile of BART	0.4%	3%	12%	All stations have a Station Area Plan supporting Plan Bay Area growth targets
		B2.	% Planned Jobs on BART Property supporting Station Area Goal of 277,500 new jobs within 1/2 mile of BART	0%	1%	5%	
		B3.	# Catalytic Development Projects (pushing market, using innovative materials, assembling land, etc)	8 total	1 per year	2 per year	
		B4.	Regional GHG reduced by TOD on BART property (pounds/day)	TBD	TBD	TBD	
C. Ridership	Increase BART ridership	C1.	Estimated Weekday Riders generated from TOD on BART property (weekend ridership not included)	3,800	6,000	20,000	200,000 Added weekday ridership from growth within 1/2 mile of BART stations
		C2.	TDM Programs established by cities, job centers, institutions near BART to encourage transit use	7			33 (All Regional Centers, City Centers, Suburban Centers, Mixed-Use Corridors)
D. Value Creation/Value Capture	Capture value of transit for infrastructure, TOD	D1.	Pilot new finance mechanisms to support transit, TOD				Successful value capture mechanisms in widespread use to finance transit, TOD
		E1.	Maximum parking spaces/residential unit	1.47			Share of HH with 0 or 1 Car within 1/2 mile of BART stations (2014: 57% with 0 or 1, 22% with 0 cars 4-County Total: 32%; 7% ³)
E. Transportation Choice	Reduce overall car ownership	E2.	Maximum parking spaces per 1,000 square feet office/retail	1.43 (Fruitvale, Richmond Pleasant Hill)			Non-auto mode to work share for workers living within 1/2 mile of BART stations (2014: 54%; 4-County Total: 30%) ³
		E3.	Reduction in vehicle trips from standard development via TDM-related measures (e.g. car share, bike share, transit passes) - equivalent to Green Trip				
F. Affordability & Equity	Ensure all incomes can live near transit	F1.	# affordable units on BART property	764	2,450	7,000	
		F2.	Share of housing units systemwide that are affordable	32%		35%	No net loss of low income households (91,000 HH earning less than \$50,000 living in 1/2 mile in 2014) ⁴
Increase Opportunities for Disadvantaged Businesses (Federal) and Small Businesses	Disadvantaged Business and Small Business Utilization	F3.		TBD	TBD	TBD	

¹Source: Plan Bay Area 2040 Preferred Scenario. Scenario may be changed once EIR is complete in 2017. Includes stations that are currently under construction, but not planned stations. Goals for 1/2 mile are derived from evaluation of Plan Bay Area growth allocated to Priority Development Areas in Alameda, Contra Costa, San Francisco and San Mateo counties, and analysis of growth distribution to MAX's new stations. Regional GHG goal will be aligned with forthcoming targets established by State of California.

²Consistent with Station Access Performance Targets, but extended to 2040.

³Source: U.S. Census 2009-2014 American Community Survey, holding average data across 4 year period. Data is for U.S. Census tracts clipped to 1/2 mile of BART, and proportionately adjusted.

⁴Ibid. "Low Income" is defined as household earning less than \$50,000. In 2016, HUD defines a 2-person "Low Income" Household as earning less than \$60,150 in the East Bay, and \$78,800 in the West Bay, and \$78,800 in the West Bay, and future targets are in 2014 inflation adjusted dollars.



BART STATION ACCESS POLICY

Adopted June 9, 2016

VISION

For more than 40 years, the San Francisco Bay Area Rapid Transit District (BART) has been a steward of major public investment to connect people and places. The BART Station Access Policy is designed to support the broader livability goals of the Bay Area, reinforce sustainable communities, and enable riders to get to and from stations safely, comfortably, affordably, and cost-effectively.

GOALS

A. Safer, Healthier, Greener. Advance the region's safety, public health, and greenhouse gas (GHG) and pollution-reduction goals.

1. Ensure safe access for all users of the BART system, including users with disabilities.
2. Promote and invest in active transportation access modes to improve public health.
3. Prioritize the most sustainable access modes, with a focus on the lowest greenhouse gas and pollutant emissions per trip.
4. Reduce the access mode share of the automobile by enhancing multi-modal access to and from BART stations in partnership with communities and access providers.
5. Develop station-level designs that are consistent with the Station Design Access Hierarchy (Figure 1).

B. More Riders. Invest in station access to connect more riders cost-effectively, especially where and when BART has available capacity.

1. As ridership grows, invest in and manage access resources so as not to exacerbate peak period – peak direction crowding, including by ensuring users can find parking spaces at all times of day.
2. Develop access solutions that promote reverse-peak and off-peak ridership to optimize use of the BART system.

C. More Productive and Efficient. Manage access investments, programs, and current assets to achieve goals at the least cost.

1. Consider life-cycle costs, including capital and operating budget implications, using best asset management practices.
2. Factor land value in decision-making, prioritizing access that generates the most riders with the least space.
3. Consider the Station Access Investment Framework (Figure 2) in identifying contextual access investments at each station, and seek to move stations from their existing to their aspirational types.

D. Better Experience. Be a better neighbor, and strive for an excellent customer experience, including on the first and last mile of the trip to and from BART stations.

1. Expand station access choices for all riders.

BART STATION ACCESS POLICY

2. Promote Transit-Oriented Development (TOD) on and off of BART property as a powerful access tool, putting more riders within walking distance of stations, connecting communities.
3. Collaborate with local jurisdictions to improve station access and create more sustainable communities, including by promoting access improvements off BART property.
4. Ensure high quality design for access improvements, with careful consideration of the local context and the quality of the environment accessing BART.

E. **Equitable Services.** Invest in access choices for all riders, particularly those with the fewest choices.

1. Ensure that disadvantaged communities share in the benefits of BART accessibility.
2. Strive to be a partner to reduce the cost of living (i.e., transportation and housing) in the Bay Area for low-income communities by increasing access and housing options (i.e. TOD), providing greater access to opportunity.
3. Use Universal Design principles to improve safety and ensure access is available for everyone at all times.

F. **Innovation and Partnerships.** Be an innovation leader, and establish durable partnerships with municipalities, access providers, and technology companies.

1. Involve BART riders in station access decision-making.
2. Develop partnerships with municipalities, transit operators, developers, technology providers, corporate shuttle providers, Transportation Network Companies, bike share operators, advocacy groups and other entities to best meet access goals.
3. Continue to research and pilot emerging technologies and new forms of access services to keep up with the rapidly-changing transportation ecosystem.
4. Remain technology- and operator-agnostic; make long-term investments in the access technologies and services that best meet the needs of BART riders.
5. Prioritize projects that leverage other fund sources and local matches both to further build partnerships and to capture more value from BART investments.

STRATEGIES

Plan, Innovate and Partner

1. Plan for systemwide access mode shift to reduce drive alone rates.
2. Partner with interested stakeholders to improve access to the BART system.
3. Plan all BART facilities to be accessible to all users, including users with disabilities.

Invest and Implement

1. Invest in the pedestrian and bicycle assets with a focus on BART property, and partner to advance projects off BART property, including partnering on local initiatives, such as Vision Zero, Safe Routes to School, and Safe Routes to Transit.

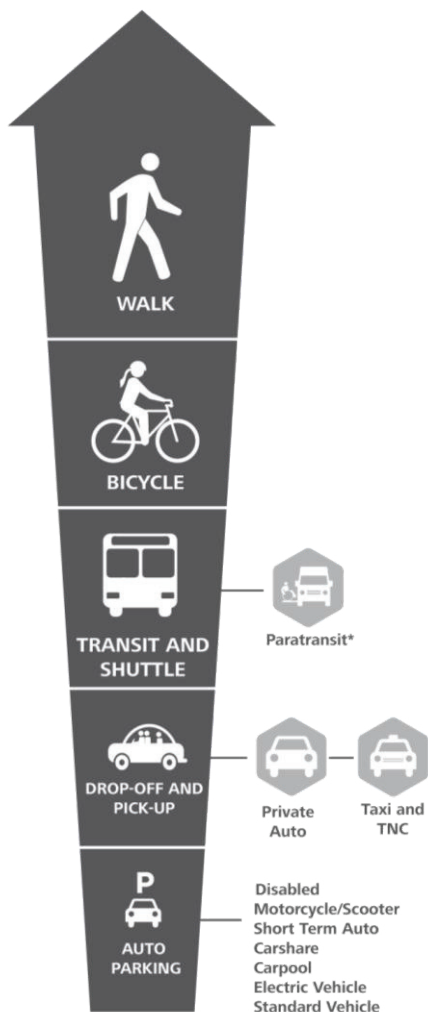
BART STATION ACCESS POLICY

2. Invest in transit connections, including investments that improve passenger experience in transit transfers (shelters, real-time information); seek to reduce barriers to transit connections; and partner with local transit service providers on last mile improvements.
3. Prioritize station access investments that support ridership **growth where and when the system has capacity**.
4. Improve management of existing parking resources, and invest in or partner on strategic parking resources; including shared parking, on-street parking, programs to maximize existing parking assets, and locating new parking resources only where other approaches are not sufficient, consistent with the station typology investment matrix.

Manage and Assess

1. Manage resources we have.
2. Regularly collect and analyze station access data, and consider emerging data sources.
3. Develop a 4-year work plan to identify projects BART staff will advance in the near-term.
4. Revisit the Station Access Policy every ten years.

FIGURE 1: STATION ACCESS DESIGN HIERARCHY



*All Stations must be paratransit accessible

Note: All stations must always remain readily accessible to and usable by persons with disabilities

BART STATION ACCESS POLICY

FIGURE 2: STATION ACCESS INVESTMENT FRAMEWORK

STATION TYPE	PRIMARY INVESTMENTS	SECONDARY INVESTMENTS	ACCOMMODATED	NOT ENCOURAGED
URBAN	Walk Bicycle	Transit and Shuttle	Taxi and TNC Drop-Off and Pick-Up	P Auto Parking*
URBAN WITH PARKING	Walk Bicycle	Transit and Shuttle	Taxi and TNC Drop-Off and Pick-Up	P Auto Parking*
BALANCED INTERMODAL	Walk Bicycle	Transit and Shuttle Drop-Off and Pick-Up	Taxi and TNC Auto Parking*	
INTERMODAL/AUTO RELIANT	Walk	Bicycle Drop-Off and Pick-Up Transit and Shuttle	Taxi and TNC Auto Parking*	
AUTO DEPENDENT	Walk	Bicycle Drop-Off and Pick-Up Auto Parking* Transit and Shuttle	Taxi and TNC	

Primary Investment:

BART will prioritize investments of funds and staff time on and off of BART property, consistent with access goals; priority projects best achieve policy goals, focus on safety and sustainability.

Secondary Investment:

BART will invest funds and staff time on and off of BART property, consistent with policy goals; secondary investments balance policy goals.

Accommodated:

BART will maintain and manage existing assets, and partner with other access providers as needed.

Not Encouraged:

BART will not invest in construction of parking expansion.

Note: TNC is for Transportation Network Company (shared use mobility)

*Parking Management is a secondary investment at all stations with parking.
*Parking replacement for transit-oriented development to be determined by BART's Transit-Oriented Development Policy.

Technical Appendix

Station Performance Measurement Results

San Leandro BART

Description

This conceptual transit-oriented development (TOD) scenario adds 1,207 housing units of which 422 (35 percent) are below-market rate (BMR) units, replaces 269 (30 percent) of the existing 898 BART patron parking spaces, and includes no commercial or retail space (although this may change depending on local desires).¹

The GreenTRIP Connect reports for this station indicate estimated greenhouse gas emissions (GHGs) and vehicle miles traveled (VMT) with and without a transportation demand management (TDM) program that includes the BMR units, as previously specified in section II of this report.

Performance Measure Calculations and Results

Complete Communities

Housing and community amenities are higher-value land uses for this site than is surface parking. This conceptual scenario adds 1,207 housing units and no commercial or retail space.

Sustainable Communities Strategy

A TOD at the San Leandro BART station site will generate fewer GHGs than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).² The TOD will generate fewer CO₂ emissions than the regional average, *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce CO₂ emissions to a level substantially below the regional average, as shown in Table 1.

Table 1: Estimated CO₂ Emissions Per Day for 1,207 Housing Units^{3,4}

	Typical Location Regional Average	TOD at San Leandro <i>without</i> TDM	TOD at San Leandro <i>with</i> TDM
Per Housing Unit	17.01 kg CO ₂	14.57 kg CO ₂	7.17 kg CO ₂
Reduction from Avg.	N/A	14.3%	57.8%
Development Total	8,403 kg CO₂	7,198 kg CO₂	3,542 kg CO₂

¹ BART, *BART's Transit-Oriented Development Program Work Plan*, Public Draft, August 2020.

² TransForm, GreenTRIP Connect Methodology.

³ TransForm, *GreenTRIP Connect Report*, San Leandro station, no TDM, December 4, 2020.
<https://connect.greentrip.org/map-tool.php?p=317782>.

⁴ TransForm, *GreenTRIP Connect Report*, San Leandro station, TDM, December 4, 2020.
<https://connect.greentrip.org/map-tool.php?p=317825>.

Ridership

The updated BART Station Access Model estimates that, despite losing 520 riders per day due to reduced patron parking, the TOD land uses add 2,600 riders per day, resulting in a **net increase of 2,080 riders per day**.⁵

Value Creation and Value Capture

A summary of value creation for this station is shown in Table 2. Details follow.

Table 2: Summary of Value Creation

Annual Revenue from BART Fares and Parking Fees	\$2,011,000
Annual Revenue from Property Tax and Ground Lease	\$4,253,479
Total Annual Revenue	\$6,264,479
Cost to Rebuild and Maintain Parking for 40 Years	(\$23,144,760)

Revenue Generated by BART Fares and Parking Fees

TransForm used the updated BART Station Access Model to estimate revenue from BART fares and parking fees. Despite revenue lost from reduced BART patron parking related fees and fares, the fares generated by the TOD result in a net revenue increase as shown in Table 3.

Table 3: Revenue Generated by BART Fares and Parking Fees⁶

Daily Revenue from Reduced BART Parking Related Fees and Fares ⁷	- \$3,610
Daily Revenue from TOD Related Fares	\$10,140
Net Daily Revenue from BART Fares and Parking Fees	\$6,530
Net Annual Revenue from BART Fares and Parking Fees	\$2,011,000

Property Taxes and Ground Lease Revenue

Property tax revenue generated by market rate development would yield financial benefits for the city, as public agencies such as BART do not pay property tax. A TOD of this size is expected to generate significant property tax and ground lease revenue as shown in Table 4 below.

⁵ TransForm, *BART Station Access Model Outputs*, December 4, 2020.

⁶ TransForm, *BART Station Access Model Outputs*, version 6, January 8, 2021.

⁷ Includes fares and fees lost due to parking reduction, cost of rebuilding parking, and costs saved from less parking maintenance.

Table 4: Estimated Annual Ground Lease and Property Tax Revenue⁸

Annual Ground Lease Revenue	Annual Property Tax Revenue	Total Annual Revenue
\$331,756	\$3,921,723	\$4,253,479

Cost of BART Patron Parking

A summary of the estimated costs to build and maintain replacement BART patron parking is shown in Table 5.

Table 5: Estimated Cost to Build and Maintain 269 Structured Parking Spaces

Type of Cost	Upfront and Annual Cost <i>per Space</i>	Upfront and Annual Cost <i>Total</i>	40 Year Cost <i>Total</i>
Construction	\$65,000	\$17,485,000	\$17,485,000
Operations and Maintenance	\$526 ⁹	\$141,494	\$5,659,760
Total Cost	\$65,526	\$17,626,494	\$23,144,760

Transportation Choice**Reducing Driving and Parking at Stations**

An effective strategy to reduce the number of BART patrons who drive and park at BART stations is to limit the amount of parking at the stations. Currently, approximately 76 percent of San Leandro patrons access the station using sustainable modes—by walking, biking, taking transit or being dropped off. Approximately 24 percent access the station by driving to and parking at or near the station.¹⁰ Replacing only 30 percent of existing parking spaces is expected to result in 93 percent of BART patrons using sustainable modes, an 17 percent increase.¹¹

Reducing Household VMT

A TOD at the San Leandro BART station site will generate fewer VMT than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).¹² The TOD will generate fewer VMT than the regional average *even without a TDM*

⁸ Economic & Planning Systems, Inc, *Draft Economic Impact of BART Transit Oriented Development*; EPS #201018, 2020.

⁹ *BART Station Access Model Assumptions*, version 6, 2021.

¹⁰ BART, *Station Profile Study*, 2015.

¹¹ For calculations see section VIII.E. of the Technical Appendix.

¹² TransForm, GreenTRIP Connect Methodology.

program. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce VMT to a level substantially below the regional average and by more than 20 percent as required by BART¹³, as shown in Table 6.

Table 6: Estimated VMT Per Day for 1,119 Housing Units

	Typical Location Regional Average ¹⁴ (miles/day)	TOD at San Leandro <i>without</i> TDM ¹⁵ (miles/day)	TOD at San Leandro <i>with</i> TDM ¹⁶ (miles/day)
Per Housing Unit	62	27.92	13.74
Reduction from Avg.	N/A	55.0%	77.8%
Reduction at TOD	N/A	N/A	51% ¹⁷
Development Total	30,628	13,792	6,788

Affordability and Equity

The 422 BMR units this conceptual scenario adds to BART’s development portfolio make up approximately 6.0 percent of BART’s system wide 2040 Performance Target of 7,000 affordable housing units.¹⁸

¹³ BART, *BART Transit-Oriented Development Transportation Demand Management Program*.

¹⁴ Metropolitan Transportation Commission (MTC), *Vital Signs*, February 2019. Average VMT is 23 miles/person/day. Average Bay Area household size is 2.69 persons. 23 VMT/person/day x 2.69 persons/household = 61.68 VMT/household/day.

¹⁵ TransForm, *GreenTRIP Connect Report*, San Leandro station, no TDM.

¹⁶ TransForm, *GreenTRIP Connect Report*, San Leandro station, TDM.

¹⁷ VMT/unit at TOD with TDM / VMT/unit at TOD without TDM or 13.74 VMT / 27.92 VMT = 0.49

¹⁸ BART, *BART’s Transit-Oriented Development Program Work Plan*.

Technical Appendix

Station Performance Measurement Results

Rockridge BART

Description

This conceptual transit-oriented development (TOD) scenario adds 284 housing units of which all are below-market rate (BMR) units, replaces none of the existing 886 BART patron parking spaces, and includes no commercial or retail space (although this may change depending on local desires).¹

The GreenTRIP Connect reports for this station indicate estimated greenhouse gas emissions (GHGs) and vehicle miles traveled (VMT) with and without a transportation demand management (TDM) program that includes the BMR units, as previously specified in section II of this report.

Performance calculations and results

Complete Communities

Housing and community amenities are higher-value land uses for this site than is surface parking. This conceptual scenario adds 284 housing units and no commercial or retail space.

Sustainable Communities Strategy

A TOD at the Rockridge BART station site will generate fewer GHGs than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).² The TOD will generate fewer CO₂ emissions than the regional average, *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce CO₂ emissions to a level substantially below the regional average, as shown in Table 1.

Table 1: Estimated CO₂ Emissions Per Day for 284 Housing Units^{3,4}

	Typical Location Regional Average	TOD at Rockridge <i>without</i> TDM	TOD at Rockridge <i>with</i> TDM
Per Housing Unit	16.18 kg CO ₂	13.07 kg CO ₂	5.33 kg CO ₂
Reduction from Avg.	N/A	19.2%	67.1%
Development Total	4,595 kg CO₂	3,712 kg CO₂	1,514 kg CO₂

¹ BART, *BART's Transit-Oriented Development Program Work Plan*, Public Draft, August 2020.

² TransForm, GreenTRIP Connect Methodology.

³ TransForm, *GreenTRIP Connect Report*, Rockridge station, no TDM, December 3, 2020, <https://connect.greentrip.org/map-tool.php?p=317696>.

⁴ TransForm, *GreenTRIP Connect Report*, Rockridge station, TDM, December 3, 2020, <https://connect.greentrip.org/map-tool.php?p=317739>.

Ridership

The updated BART Station Access Model estimates that 820 riders per day would be lost due to reduced patron parking and 470 riders per day would be added by the TOD land uses, resulting in a **net decrease of 350 riders per day**.⁵

Value Creation and Value Capture

A summary of value creation for this station is shown in Table 2. Details follow.

Table 2: Summary of Value Creation

Annual Revenue from BART Fares and Parking Fees	-\$496,000
Annual Revenue from Property Tax and Ground Lease	\$77,999
Total Annual Revenue	-\$418,001
Cost to Rebuild and Maintain Parking for 40 Years	N/A

Revenue Generated by BART Fares and Parking Fees

TransForm used the updated BART Station Access Model to estimate revenue from BART fares and parking fees. Revenue lost from reduced BART patron parking related fees and fares is more than the fares generated by the TOD, resulting in a net revenue decrease as shown in Table 3.

Table 3: Revenue Generated by BART Fares and Parking Fees⁶

Daily Revenue from Reduced BART Parking Related Fees and Fares ⁷	-\$4,050
Daily Revenue from TOD Related Fares	\$1,820
Net Daily Revenue from BART Fares and Parking Fees	-\$2,230
Net Annual Revenue from BART Fares and Parking Fees	-\$496,000

Property Taxes and Ground Lease Revenue

A TOD of this size is expected to generate ground lease revenue as shown in Table 4. This scenario will not generate property tax revenue as no market rate housing units are included.

⁵ TransForm, *BART Station Access Model Outputs*, December 3, 2020.

⁶ TransForm, *BART Station Access Model Outputs*, version 6, January 8, 2021.

⁷ Includes fares and fees lost due to parking reduction, cost of rebuilding parking, and costs saved from less parking maintenance.

Table 4: Estimated Annual Ground Lease and Property Tax Revenue ⁸

Annual Ground Lease Revenue	Annual Property Tax Revenue	Total Annual Revenue
\$77,999	N/A	\$77,999

Cost of BART Patron Parking

This scenario includes no replacement BART patron parking.

Note: Table 5 not applicable to this station.

Transportation Choice

Reducing Driving and Parking at Stations

An effective strategy to reduce the number of BART patrons who drive and park at BART stations is to limit the amount of parking at the stations. Currently, approximately 65 percent of Rockridge patrons access the station using sustainable modes—by walking, biking, taking transit or being dropped off. Approximately 34 percent access the station by driving to and parking at or near the station.⁹ Replacing 0 percent of existing parking spaces is expected to result in 83 percent of BART patrons using sustainable modes, an 18 percent increase.¹⁰

Reducing Household VMT

A TOD at the Rockridge BART station site will generate fewer VMT than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).¹¹ The TOD will generate fewer VMT than the regional average *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce VMT to a level substantially below the regional average and by more than 20 percent as required by BART ¹², as shown in Table 6.

⁸ Economic & Planning Systems, Inc, *Draft Economic Impact of BART Transit Oriented Development*; EPS #201018, 2020.

⁹ BART, *Station Profile Study*, 2015.

¹⁰ For calculations see section VIII.E. of the Technical Appendix.

¹¹ TransForm, *GreenTRIP Connect Methodology*.

¹² BART, *BART Transit-Oriented Development Transportation Demand Management Program*.

Table 6: Estimated VMT Per Day for 284 Housing Units

	Typical Location Regional Average ¹³ (miles/day)	TOD at Rockridge <i>without</i> TDM ¹⁴ (miles/day)	TOD at Rockridge <i>with</i> TDM ¹⁵ (miles/day)
Per Housing Unit	62	25.03	10.22
Reduction from Avg.	N/A	59.6%	83.5%
Reduction at TOD	N/A	N/A	59% ¹⁶
Development Total	17,608	7,109	2,902

Affordability and Equity

The 284 BMR units this conceptual scenario adds to BART’s development portfolio make up approximately 4.1 percent of BART’s system wide 2040 Performance Target of 7,000 affordable housing units.¹⁷

¹³ Metropolitan Transportation Commission (MTC), Vital Signs, February 2019. Average VMT is 23 miles/person/day. Average Bay Area household size is 2.69 persons. 23 VMT/person/day x 2.69 persons/household = 61.68 VMT/household/day.

¹⁴ TransForm, *GreenTRIP Connect Report*, Rockridge station, no TDM.

¹⁵ TransForm, *GreenTRIP Connect Report*, Rockridge station, TDM.

¹⁶ VMT/unit at TOD with TDM / VMT/unit at TOD without TDM or 10.22 VMT / 25.03 VMT = 0.41

¹⁷ BART, *BART’s Transit-Oriented Development Program Work Plan*.

Technical Appendix

Station Performance Measurement Results

North Berkeley BART

Description

This conceptual transit-oriented development (TOD) scenario adds 1,119 housing units of which 559 (50 percent) are below-market rate (BMR) units, replaces 227 (30 percent) of the existing 756 BART patron parking spaces, and includes no commercial or retail space (although this may change depending on local desires).¹

The GreenTRIP Connect reports for this station indicate estimated greenhouse gas emissions (GHGs) and vehicle miles traveled (VMT) with and without a transportation demand management (TDM) program that includes the BMR units, as previously specified in section II of this report.

Performance calculations and results

Complete Communities

Housing and community amenities are higher-value land uses for this site than is surface parking. This conceptual scenario adds 1,119 housing units and no commercial or retail space.

Sustainable Communities Strategy

A TOD at the North Berkeley BART station site will generate fewer GHGs than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).² The TOD will generate fewer CO₂ emissions than the regional average, *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce CO₂ emissions to a level substantially below the regional average, as shown in Table 1.

¹ BART, *BART's Transit-Oriented Development Program Work Plan*, Public Draft, August 2020.

² TransForm, GreenTRIP Connect Methodology.

Table 1: Estimated CO₂ Emissions Per Day for 1,119 Housing Units^{3, 4}

	Typical Location Regional Average	TOD at North Berkeley <i>without</i> TDM	TOD at North Berkeley <i>with</i> TDM
Per Housing Unit	17.01 kg CO ₂	11.72 kg CO ₂	4.81 kg CO ₂
Reduction from Avg.	N/A	31.1%	71.7%
Development Total	19,034 kg CO₂	13,115 kg CO₂	5,382 kg CO₂

Ridership

The updated BART Station Access Model estimates that, despite losing 440 riders per day due to reduced BART patron parking, the TOD land uses add 2,270 riders per day, resulting in a **net increase of 1,830 riders per day**.⁵

Value Creation and Value Capture

A summary of value creation for this station is shown in Table 2. Details follow.

Table 2: Summary of Value Creation

Annual Revenue from BART Fares and Parking Fees	\$1,634,000
Annual Revenue from Property Tax and Ground Lease	\$3,104,088
Total Annual Revenue	\$4,738,088
Cost to Rebuild and Maintain Parking for 40 Years	(\$19,531,080)

Revenue Generated by BART Fares and Parking Fees

TransForm used the updated BART Station Access Model to estimate revenue from BART fares and parking fees. Despite revenue lost from reduced BART patron parking related fees and fares, the fares generated by the TOD result in a net revenue increase as shown in Table 3.

³ TransForm, *GreenTRIP Connect Report*, N. Berkeley station, no TDM, December 2, 2020, <https://connect.greentrip.org/map-tool.php?p=316277>.

⁴ TransForm, *GreenTRIP Connect Report*, N. Berkeley station, TDM, December 2, 2020, <https://connect.greentrip.org/map-tool.php?p=316234>.

⁵ TransForm, *BART Station Access Model Outputs*, December 2, 2020.

Table 3: Revenue Generated by BART Fares and Parking Fees⁶

Daily Revenue from Reduced BART Parking Related Fees and Fares ⁷	- \$3,320
Daily Revenue from TOD Related Fares	\$8,580
Net Daily Revenue from BART Fares and Parking Fees	\$5,620
Net Annual Revenue from BART Fares and Parking Fees	\$1,634,000

Property Taxes and Ground Lease Revenue

Property tax revenue generated by market rate development would yield financial benefits for the city, as public agencies such as BART do not pay property tax. A TOD of this size is expected to generate property tax and ground lease revenue as shown in Table 4.

Table 4: Estimated Annual Ground Lease and Property Tax Revenue⁸

Annual Ground Lease Revenue	Annual Property Tax Revenue	Total Annual Revenue
\$307,500	\$2,796,588	\$3,104,088

Cost of BART Patron Parking

A summary of the estimated costs to build and maintain replacement BART patron parking is shown in Table 5.

Table 5: Estimated Cost to Build and Maintain 227 Structured Parking Spaces

Type of Cost	Upfront and Annual Cost <i>per Space</i>	Upfront and Annual Cost <i>Total</i>	40 Year Cost <i>Total</i>
Construction	\$65,000	\$14,755,000	\$14,755,000
Operations and Maintenance	\$526 ⁹	\$119,402	\$4,776,080
Total Cost	\$65,526	14,874,402	\$19,531,080

⁶ TransForm, *BART Station Access Model Outputs*, version 6, January 8, 2021.

⁷ Includes fares and fees lost due to parking reduction, cost of rebuilding parking, and costs saved from less parking maintenance.

⁸ Economic & Planning Systems, Inc, *Draft Economic Impact of BART Transit-Oriented Development*; EPS #201018, 2020.

⁹ *BART Station Access Model Assumptions*, version 6, 2021.

Transportation Choice

Reducing Driving and Parking at Stations

An effective strategy to reduce the number of BART patrons who drive and park at BART stations is to limit the amount of parking at the stations. Currently, approximately 74 percent of North Berkeley patrons access the station using sustainable modes—by walking, biking, taking transit or being dropped off. Approximately 25 percent access the station by driving to and parking at or near the station.¹⁰ Replacing only 30 percent of existing parking spaces is expected to result in 93 percent of BART patrons using sustainable modes, an 19 percent increase.¹¹

Reducing Household Driving

A TOD at the North Berkeley BART station site will generate fewer VMT than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).¹² The TOD will generate fewer VMT than the regional average *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce VMT to a level substantially below the regional average and by more than 20 percent as required by BART¹³, as shown in Table 6.

Table 6: Estimated VMT Per Day for 1,119 Housing Units

	Typical Location Regional Average ¹⁴ (miles/day)	TOD at North Berkeley <i>without</i> TDM ¹⁵ (miles/day)	TOD at North Berkeley <i>with</i> TDM ¹⁶ (miles/day)
Per Housing Unit	62	22.46	9.21
Reduction from Avg.	N/A	63.8%	85.1%
Reduction at TOD	N/A	N/A	59% ¹⁷
Development Total	69,378	25,133	10,306

¹⁰ BART, *Station Profile Study*, 2015.

¹¹ For calculations see section VIII.E. of the Technical Appendix.

¹² TransForm, *GreenTRIP Connect Methodology*.

¹³ BART, *BART Transit-Oriented Development Transportation Demand Management Program*.

¹⁴ Metropolitan Transportation Commission (MTC), *Vital Signs*, February 2019. Average VMT is 23 miles/person/day. Average Bay Area household size is 2.69 persons. 23 VMT/person/day x 2.69 persons/household = 61.68 VMT/household/day.

¹⁵ TransForm, *GreenTRIP Connect Report*, N. Berkeley station, no TDM.

¹⁶ TransForm, *GreenTRIP Connect Report*, N. Berkeley station, TDM.

¹⁷ VMT/unit at TOD with TDM / VMT/unit at TOD without TDM or 9.21 VMT / 22.46 VMT = 0.41

Affordability and Equity

The 599 BMR units this conceptual scenario adds to BART’s development portfolio make up approximately 8.6 percent of BART’s system wide 2040 Performance Target of 7,000 affordable housing units.¹⁸

¹⁸ BART, *BART’s Transit-Oriented Development Program Work Plan*.

Technical Appendix

Station Performance Measurement Results

Glen Park BART

Description

This conceptual transit-oriented development (TOD) scenario adds 128 housing units of which all are below-market rate (BMR) units, replaces none of the existing 53 BART patron parking spaces, and includes no commercial or retail space (although this may change depending on local desires).¹

The GreenTRIP Connect reports for this station indicate estimated greenhouse gas emissions (GHGs) and vehicle miles traveled (VMT) with and without a transportation demand management (TDM) program that includes the BMR units, as previously specified in section II of this report.

Performance calculations and results

Complete Communities

Housing and community amenities are higher-value land uses for this site than is surface parking. This conceptual scenario adds 128 housing units and no commercial or retail space.

Sustainable Communities Strategy

A TOD at the Glen Park BART station site will generate fewer GHGs than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).² The TOD will generate fewer CO₂ emissions than the regional average, *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce CO₂ emissions to a level substantially below the regional average, as shown in Table 1.

¹ BART, *BART's Transit-Oriented Development Program Work Plan*, Public Draft, August 2020.

² TransForm, GreenTRIP Connect Methodology.

Table 1: Estimated CO₂ Emissions Per Day for 128 Housing Units^{3,4}

	Typical Location Regional Average	TOD at Glen Park <i>without</i> TDM	TOD at Glen Park <i>with</i> TDM
Per Housing Unit	16.29 kg CO ₂	10.43 kg CO ₂	3.52 kg CO ₂
Reduction from Avg.	N/A	36.0%	78.4%
Development Total	2,085 kg CO₂	1,335 kg CO₂	451 kg CO₂

Ridership

The updated BART Station Access Model estimates that no riders per day would be lost due to reduced patron parking and the TOD land uses would add 210 riders per day, resulting in a **net increase of 210 riders per day**.⁵

Value Creation and Value Capture

A summary of value creation for this station is shown in Table 2. Details follow.

Table 2: Summary of Value Creation

Annual Revenue from BART Fares and Parking Fees	\$163,000
Annual Revenue from Property Tax and Ground Lease	\$44,593
Total Annual Revenue	\$207,593
Cost to Rebuild and Maintain Parking for 40 Years	N/A

Revenue Generated by BART Fares and Parking Fees

TransForm used the updated BART Station Access Model to estimate revenue from BART fares and parking fees. Despite revenue lost from reduced BART patron parking related fees and fares, the fares generated by the TOD result in a net revenue increase as shown in Table 3.

³ TransForm, *GreenTRIP Connect Report*, Glen Park station, no TDM, December 4, 2020. <https://connect.greentrip.org/map-tool.php?p=320577>.

⁴ TransForm, *GreenTRIP Connect Report*, Glen Park station, TDM, December 4, 2020.

⁵ TransForm, *BART Station Access Model Outputs*, December 5, 2020.

Table 3: Revenue Generated by BART Fares and Parking Fees ⁶

Daily Revenue from Reduced BART Parking Related Fees and Fares ⁷	- \$50
Daily Revenue from TOD Related Fares	\$610
Net Daily Revenue from BART Fares and Parking Fees	\$560
Net Annual Revenue from BART Fares and Parking Fees	\$163,000

Property Taxes and Ground Lease Revenue

A TOD of this size is expected to generate ground lease revenue as shown in Table 4. This scenario will not generate property tax revenue as no market rate housing units are included.

Table 4: Estimated Annual Ground Lease and Property Tax Revenue ⁸

Annual Ground Lease Revenue	Annual Property Tax Revenue	Total Annual Revenue
\$44,593	N/A	\$44,593

Cost of BART Patron Parking

This scenario includes no replacement BART patron parking.

Note: Table 5 not applicable to this station.

Transportation Choice

Reducing Driving and Parking at Stations

An effective strategy to reduce the number of BART patrons who drive and park at BART stations is to limit the amount of parking at the stations. Currently, approximately 94 percent of Glen Park patrons access the station using sustainable modes—by walking, biking, taking transit or being dropped off. Approximately 6 percent access the station by driving to and parking at or near the station.⁹ Replacing 0 percent of existing parking spaces is expected to result in 95 percent of BART patrons using sustainable modes, a 1 percent increase.¹⁰

⁶ TransForm, *BART Station Access Model Outputs*, version 6, January 8, 2021.

⁷ Includes fares and fees lost due to parking reduction, cost of rebuilding parking, and costs saved from less parking maintenance.

⁸ Economic & Planning Systems, Inc, *Draft Economic Impact of BART Transit Oriented Development*; EPS #201018, 2020.

⁹ BART, *Station Profile Study*, 2015.

¹⁰ For calculations see section VIII.E. of the Technical Appendix.

Reducing Household VMT

A TOD at the Glen Park BART station site will generate fewer VMT than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).¹¹ The TOD will generate fewer VMT than the regional average *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce VMT to a level substantially below the regional average and by more than 20 percent as required by BART¹², as shown in Table 6.

Table 6: Estimated VMT Per Day for 128 Housing Units

	Typical Location Regional Average ¹³ (miles/day)	TOD at Glen Park <i>without</i> TDM ¹⁴ (miles/day)	TOD at Glen Park <i>with</i> TDM ¹⁵ (miles/day)
Per Housing Unit	62	19.06	6.43
Reduction from Avg.	N/A	69.3%	89.6%
Reduction at TOD	N/A	N/A	66% ¹⁶
Development Total	7,936	2,440	823

Affordability and Equity

The 128 BMR units this conceptual scenario adds to BART's development portfolio make up approximately 1.8 percent of BART's system wide 2040 Performance Target of 7,000 affordable housing units.¹⁷

¹¹ TransForm, GreenTRIP Connect Methodology.

¹² BART, *BART Transit-Oriented Development Transportation Demand Management Program*.

¹³ Metropolitan Transportation Commission (MTC), Vital Signs, February 2019. Average VMT is 23 miles/person/day. Average Bay Area household size is 2.69 persons. 23 VMT/person/day x 2.69 persons/household = 61.68 VMT/household/day.

¹⁴ TransForm, *GreenTRIP Connect Report*, Glen Park station, no TDM.

¹⁵ TransForm, *GreenTRIP Connect Report*, Glen Park station, TDM.

¹⁶ VMT/unit at TOD with TDM / VMT/unit at TOD without TDM or 6.43 VMT / 19.06 VMT = 0.34

¹⁷ BART, *BART's Transit-Oriented Development Program Work Plan*.

Technical Appendix

Station Performance Measurement Results

Ashby BART

Description

This conceptual transit-oriented development (TOD) scenario adds 755 housing units of which 377 (50 percent) are below-market rate (BMR) units, replaces 81 (15 percent) of the existing 541 BART patron parking spaces, and includes no commercial or retail space (although this may change depending on local desires).¹

The GreenTRIP Connect reports for this station indicate estimated greenhouse gas emissions (GHGs) and vehicle miles traveled (VMT) with and without a transportation demand management (TDM) program that includes the BMR units, as previously specified in section II of this report.

Performance calculations and results

Complete Communities

Housing and community amenities are higher-value land uses for this site than is surface parking. This conceptual scenario adds 755 housing units and no commercial or retail space.

Sustainable Communities Strategy

A TOD at the Ashby BART station site will generate fewer GHGs than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).² The TOD will generate fewer CO₂ emissions than the regional average, *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce CO₂ emissions to a level substantially below the regional average, as shown in Table 1.

Table 1: Estimated CO₂ Emissions Per Day for 755 Housing Units^{3,4}

	Typical Location Regional Average	TOD at Ashby <i>without</i> TDM	TOD at Ashby <i>with</i> TDM
Per Housing Unit	16.18 kg CO ₂	10.97 kg CO ₂	4.47 kg CO ₂
Reduction from Avg.	N/A	32.2%	72.4%
Development Total	12,216 kg CO₂	8,282 kg CO₂	3,375 kg CO₂

¹ BART, *BART's Transit-Oriented Development Program Work Plan*, Public Draft, August 2020.

² TransForm, GreenTRIP Connect Methodology.

³ TransForm, *GreenTRIP Connect Report*, Ashby Station, no TDM, December 3, 2020.
<https://connect.greentrip.org/map-tool.php?p=316363>.

⁴ TransForm, *GreenTRIP Connect Report*, Ashby Station, TDM, December 3, 2020.
<https://connect.greentrip.org/map-tool.php?p=316320>.

Ridership

The updated BART Station Access Model estimates that, despite losing 260 riders per day due to reduced patron parking, the TOD land uses add 1,550 riders per day, resulting in a **net increase of 1,290 riders per day**.⁵

Value Creation and Value Capture

A summary of value creation for this station is shown in Table 2. Details follow.

Table 2: Summary of Value Creation

Annual Revenue from BART Fares and Parking Fees	\$1,121,000
Annual Revenue from Property Tax and Ground Lease	\$2,097,441
Total Annual Revenue	\$3,214,736
Cost to Rebuild and Maintain Parking for 40 Years	(\$6,969,240)

Revenue Generated by BART Fares and Parking Fees

TransForm used the updated BART Station Access Model to estimate revenue from BART fares and parking fees. Despite revenue lost from reduced BART patron parking related fees and fares, the fares generated by the TOD result in a net revenue increase as shown in Table 3.

Table 3: Revenue Generated by BART Fares and Parking Fees⁶

Daily Revenue from Reduced BART Parking Related Fees and Fares ⁷	- \$1,770
Daily Revenue from TOD Related Fares	\$5,440
Net Daily Revenue from BART Fares and Parking Fees	\$3,670
Net Annual Revenue from BART Fares and Parking Fees	\$1,121,000

Property Taxes and Ground Lease Revenue

Property tax revenue generated by market rate development would yield financial benefits for the city, as public agencies such as BART do not pay property tax. A TOD of this size is expected to generate property tax and ground lease revenue as shown in Table 4.

⁵ TransForm, *BART Station Access Model Outputs*, December 3, 2020.

⁶ TransForm, *BART Station Access Model Outputs*, version 6, January 8, 2021.

⁷ Includes fares and fees lost due to parking reduction, cost of rebuilding parking, and costs saved from less parking maintenance.

Table 4: Estimated Annual Ground Lease and Property Tax Revenue⁸

Annual Ground Lease Revenue	Annual Property Tax Revenue	Total Annual Revenue
\$207,441	\$1,886,295	\$2,097,441

Cost of BART Patron Parking

A summary of the estimated costs to build and maintain replacement BART patron parking is shown in Table 5.

Table 5: Estimated Cost to Build and Maintain 81 Structured Parking Spaces

Type of Cost	Upfront and Annual Cost <i>per Space</i>	Upfront and Annual Cost <i>Total</i>	40 Year Cost <i>Total</i>
Construction	\$65,000	\$5,265,000	\$5,265,000
Operations and Maintenance	\$526 ⁹	\$42,606	\$1,704,240
Total Cost	\$65,526	\$5,307,606	\$6,969,240

Transportation Choice**Reducing Driving and Parking at Stations**

An effective strategy to reduce the number of BART patrons who drive and park at BART stations is to limit the amount of parking at the stations. Currently, approximately 82 percent of Ashby patrons access the station using sustainable modes—by walking, biking, taking transit or being dropped off. Approximately 18 percent access the station by driving to and parking at or near the station.¹⁰ Replacing only 15 percent of existing parking spaces is expected to result in 96 percent of BART patrons using sustainable modes, a 14 percent increase.¹¹

Reducing Household VMT

A TOD at the Ashby BART station site will generate fewer VMT than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).¹² The TOD will generate fewer VMT than the regional average *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space,

⁸ Economic & Planning Systems, Inc, *Draft Economic Impact of BART Transit Oriented Development*; EPS #201018, 2020.

⁹ *BART Station Access Model Assumptions*, version 6, 2021.

¹⁰ BART, *Station Profile Study*, 2015.

¹¹ For calculations see section VIII.E. of the Technical Appendix.

¹² TransForm, GreenTRIP Connect Methodology.

and offers car-share memberships and transit passes to residents free of charge will further reduce VMT to a level substantially below the regional average and by more than 20 percent as required by BART¹³, as shown in Table 6.

Table 6: Estimated VMT Per Day for 755 Housing Units

	Typical Location Regional Average ¹⁴ (miles/day)	TOD at Ashby <i>without</i> TDM ¹⁵ (miles/day)	TOD at Ashby <i>with</i> TDM ¹⁶ (miles/day)
Per Housing Unit	62	21.01	8.57
Reduction from Avg.	N/A	66.1%	86.2%
Reduction at TOD	N/A	N/A	59% ¹⁷
Development Total	46,810	15,863	6,470

Affordability and Equity

The 377 BMR units this conceptual scenario adds to BART’s development portfolio make up approximately 5.4 percent of BART’s system wide 2040 Performance Target of 7,000 affordable housing units.¹⁸

¹³ BART, *BART Transit-Oriented Development Transportation Demand Management Program*.

¹⁴ Metropolitan Transportation Commission (MTC), *Vital Signs*, February 2019. Average VMT is 23 miles/person/day. Average Bay Area household size is 2.69 persons. 23 VMT/person/day x 2.69 persons/household = 61.68 VMT/household/day.

¹⁵ TransForm, *GreenTRIP Connect Report*, Ashby station, no TDM.

¹⁶ TransForm, *GreenTRIP Connect Report*, Ashby station, TDM.

¹⁷ VMT/unit at TOD with TDM / VMT/unit at TOD without TDM or 8.57 VMT / 21.01 VMT = 0.41

¹⁸ BART, *BART’s Transit-Oriented Development Program Work Plan*.

Technical Appendix

Station Performance Measurement Results

Fruitvale BART

Description

This conceptual transit-oriented development (TOD) scenario adds 494 housing units of which 99 (20 percent) are below-market rate (BMR) units, replaces 268 (30 percent) of the existing 893 BART patron parking spaces, and includes no commercial or retail space (although this may change depending on local desires).¹

The GreenTRIP Connect reports for this station indicate estimated greenhouse gas emissions (GHGs) and vehicle miles traveled (VMT) with and without a transportation demand management (TDM) program that includes the BMR units, as previously specified in section II of this report.

Performance calculations and results

Complete Communities

Housing and community amenities are higher-value land uses for this site than is surface parking. This conceptual scenario adds 494 housing units and no commercial or retail space.

Sustainable Communities Strategy

A TOD at the Fruitvale BART station site will generate fewer GHGs than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).² The TOD will generate fewer CO₂ emissions than the regional average, *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce CO₂ emissions to a level substantially below the regional average, as shown in Table 1.

¹ BART, *BART's Transit-Oriented Development Program Work Plan*, Public Draft, August 2020.

² TransForm, GreenTRIP Connect Methodology.

Table 1: Estimated CO₂ Emissions Per Day for 494 Housing Units^{3,4}

	Typical Location Regional Average	TOD at Fruitvale <i>without</i> TDM	TOD at Fruitvale <i>with</i> TDM
Per Housing Unit	16.19 kg CO ₂	11.76 kg CO ₂	6.09 kg CO ₂
Reduction from Avg.	N/A	27.4%	62.4%
Development Total	7,998 kg CO₂	5,809 kg CO₂	3,008 kg CO₂

Ridership

The updated BART Station Access Model estimates that, despite losing 1,920 riders per day due to reduced patron parking, the TOD land uses add 1,110 riders per day, resulting in a **net increase of 590 riders per day**.⁵

Value Creation and Value Capture

A summary of value creation for this station is shown in Table 2. Details follow.

Table 2: Summary of Value Creation

Annual Revenue from BART Fares and Parking Fees	\$265,000
Annual Revenue from Property Tax and Ground Lease	Unknown
Total Annual Revenue	\$265,000+
Cost to Rebuild and Maintain Parking for 40 Years	(\$23,058,720)

Revenue Generated by BART Fares and Parking Fees

TransForm used the updated BART Station Access Model to estimate revenue from BART fares and parking fees. Despite revenue lost from reduced BART patron parking related fees and fares, the fares generated by the TOD result in a net revenue increase as shown in Table 3.

³ TransForm, *GreenTRIP Connect Report*, Fruitvale station, no TDM, December 3, 2020. <https://connect.greentrip.org/map-tool.php?p=320491>.

⁴ TransForm, *GreenTRIP Connect Report*, Fruitvale station, TDM, December 3, 2020. <https://connect.greentrip.org/map-tool.php?p=320534>.

⁵ TransForm, *BART Station Access Model Outputs*, December 4, 2020.

Table 3: Revenue Generated by BART Fares and Parking Fees ⁶

Daily Revenue from Reduced BART Parking Related Fees and Fares ⁷	- \$3,450
Daily Revenue from TOD Related Fares	\$3,940
Net Daily Revenue from BART Fares and Parking Fees	\$490
Net Annual Revenue from BART Fares and Parking Fees	\$265,000

Property Taxes and Ground Lease Revenue

This information is not available as the TOD size and BMR assumptions in *BART's Transit-Oriented Development Program Work Plan* does not match the source for property tax and ground lease revenues.^{8, 9}

Note: Table 4 not applicable to this station.

Cost of BART Patron Parking

A summary of the estimated costs to build and maintain replacement BART patron parking is shown in Table 5.

Table 5: Estimated Cost to Build and Maintain 268 Structured Parking Spaces

Type of Cost	Upfront and Annual Cost <i>per Space</i>	Upfront and Annual Cost <i>Total</i>	40 Year Cost <i>Total</i>
Construction	\$65,000	\$17,420,000	\$17,420,000
Operations and Maintenance	\$526 ¹⁰	\$140,968	\$5,638,720
Total Cost	\$65,526	14,874,402	\$23,058,720

Transportation Choice

Reducing Driving and Parking at Stations

An effective strategy to reduce the number of BART patrons who drive and park at BART stations is to limit the amount of parking at the stations. Currently, approximately 76 percent of Fruitvale patrons access the station using sustainable modes—by walking, biking, taking transit or getting dropped off. Approximately 24 percent access the station by driving to and parking at

⁶ TransForm, *BART Station Access Model Outputs*, version 6, January 8, 2021.

⁷ Includes fares and fees lost due to parking reduction, cost of rebuilding parking, and costs saved from less parking maintenance.

⁸ Economic & Planning Systems, Inc, *Draft Economic Impact of BART Transit Oriented Development*; EPS #201018, 2020.

⁹ BART, *BART's Transit-Oriented Development Program Work Plan*.

¹⁰ *BART Station Access Model Assumptions*, version 6, 2021.

or near the station.¹¹ Replacing only 30 percent of existing parking spaces is expected to result in 88 percent of BART patrons using sustainable modes, an 12 percent increase.¹²

Reducing Household VMT

A TOD at the Fruitvale BART station site will generate fewer VMT than a development in a Bay Area location not adjacent to a regionally connected transit stop by virtue of its density and location efficiency variables (employment density, transit availability, neighborhood commute distance).¹³ The TOD will generate fewer VMT than the regional average *even without a TDM program*. Implementation of a TDM program that includes BMR units, limits residential parking to 0.5 spaces per unit, unbundles parking, charges \$100/month for a residential parking space, and offers car-share memberships and transit passes to residents free of charge will further reduce VMT to a level substantially below the regional average and by more than 20 percent as required by BART¹⁴, as shown in Table 6.

Table 6: Estimated VMT Per Day for 494 Housing Units

	Typical Location Regional Average ¹⁵ (miles/day)	TOD at Fruitvale <i>without</i> TDM ¹⁶ (miles/day)	TOD at Fruitvale <i>with</i> TDM ¹⁷ (miles/day)
Per Housing Unit	62	22.52	11.66
Reduction from Avg.	N/A	63.7%	81.2%
Reduction at TOD	N/A	N/A	48% ¹⁸
Development Total	30,628	11,125	5,706

Affordability and Equity

The 99 BMR units this conceptual scenario adds to BART’s development portfolio make up approximately 1.4 percent of BART’s system wide 2040 Performance Target of 7,000 affordable housing units.¹⁹

¹¹ BART, *Station Profile Study*, 2015.

¹² For calculations see section VIII.E. of the Technical Appendix.

¹³ TransForm, *GreenTRIP Connect Methodology*.

¹⁴ BART, *BART Transit-Oriented Development Transportation Demand Management Program*.

¹⁵ Metropolitan Transportation Commission (MTC), *Vital Signs*, February 2019. Average VMT is 23 miles/person/day. Average Bay Area household size is 2.69 persons. 23 VMT/person/day x 2.69 persons/household = 61.68 VMT/household/day.

¹⁶ TransForm, *GreenTRIP Connect Report*, Fruitvale station, no TDM.

¹⁷ TransForm, *GreenTRIP Connect Report*, Fruitvale station, TDM.

¹⁸ VMT/unit at TOD with TDM / VMT/unit at TOD without TDM or 11.66 VMT / 22.52 VMT = 0.52

¹⁹ BART, *BART’s Transit-Oriented Development Program Work Plan*.

VIII. Technical Appendix

B. GreenTRIP Connect Reports

1. North Berkeley
 - a. No Transportation Demand Management (TDM) or Below Market Rate BMR homes
 - b. TDM and BMR per Station Analysis
2. Ashby
 - a. No TDM or BMR
 - b. TDM and BMR per Station Analysis
3. Rockridge
 - a. No TDM or BMR
 - b. TDM and BMR per Station Analysis
4. Fruitvale
 - a. No TDM or BMR
 - b. TDM and BMR per Station Analysis
5. San Leandro
 - a. No TDM or BMR
 - b. TDM and BMR per Station Analysis
6. Glen Park
 - a. No TDM or BMR
 - b. TDM and BMR per Station Analysis



Connect project report



North Berkeley BART Station

URL: [Generate link](https://connect.greentrip.org/map-tool.php?p=316277) https://connect.greentrip.org/map-tool.php?p=316277

Prepared by: 20201202 Nina Rizzo

Project status: Conceptual

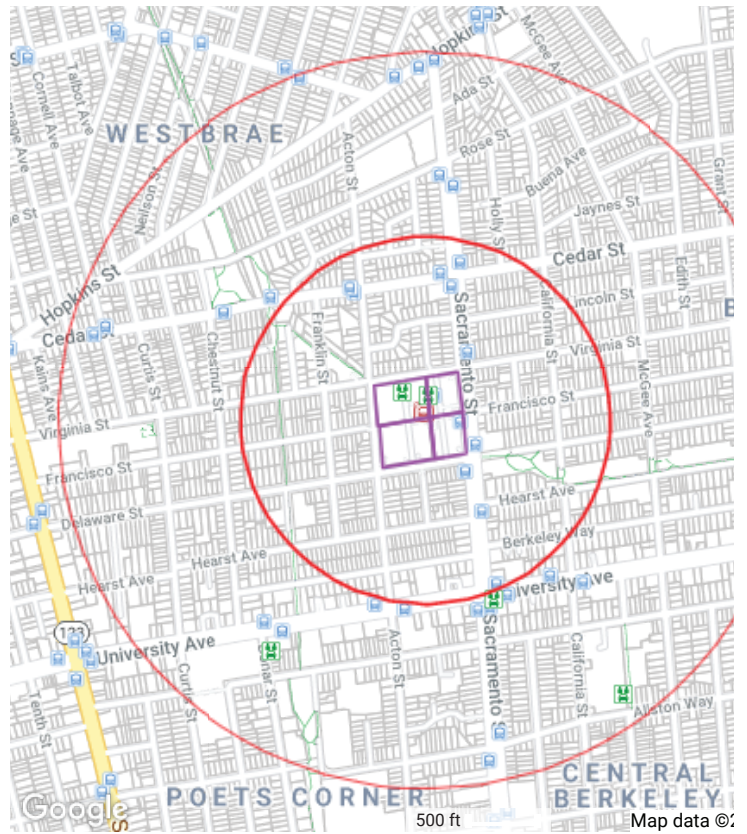
Additional project info: Scenario without TDM and no BMR. Assumptions: Refer to Task 4.2 report.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **11,324 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **31% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **16% less** parking use every **day** compared to the MTC/ABAG average.
- **\$0** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$-53,150,000** in parking construction cost if built with **0.95** instead of the municipal requirement of **spaces/unit**.
- **Saving 60,426 sq.ft.** in parking spaces which could be allocated to **81 housing units of 747 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **1119 units**
 Parking proposed: **1063 spaces**
 Density: **137.89 units/acre**
 Parking ratio: **0.95 spaces/unit**

**GreenTRIP
 certification
 ready?**



Almost

[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	32.58	17.01	1.13
if built on selected parcel	22.46	11.72	0.95
with affordable housing	--	--	--
with GreenTRIP strategies	--	--	--
Your project	22.46	11.72	0.95

\$0 Resident savings from selected GreenTRIP strategies per year/unit

\$-53,150,000 Cost on parking compared to municipal parking requirement of **1** spaces/unit, or **0** spaces total.

 31% Less driving 10.12 Fewer miles per year	 31% Less climate impact 5.28 Fewer CO ₂ per year	 16% Less parking used 0.18 Fewer parking spaces used
--	--	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

*All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
67 Studio	470	\$2,062
560 1 BR	660	\$2,062
425 2 BR	850	\$2,650
67 3+ BR	1,100	\$2,650
1,119 Total	747	\$2,321

Total acres: 8.12

Dwelling units per acre: 137.89

Bedrooms per acre: 206.78

Parking





Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
1,063 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--
1063 Total		

Used spaces per dwelling unit: 0.95

Used spaces per bedroom: 0.63

Charge for parking per month: none

GreenTRIP strategies

	Household value per year
 Resident transit passes <i>none</i>	\$0
 Car sharing memberships <i>none</i>	\$0
 Bike sharing memberships <i>none</i>	\$0
	\$0
 Unbundled parking \$0 per month for residents or for public use	

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

Affordable housing

none

Connect project report (page 4)



Nearby transportation

Transit within a 1/4 mile:

AC Transit

604, 800, 51b, fs, 688, 52

Bay Area Rapid Transit

fremont - richmond, richmond - daly city/millbrae

Bear Transit - UC Berkeley Shuttle - Night

shared services shuttle

Transit within a 1/2 mile:

AC Transit

88, 604, j, 25, 800, 51b, fs, h, 688, 52

Bay Area Rapid Transit

fremont - richmond, richmond - daly city/millbrae

Bear Transit - UC Berkeley Shuttle - Night

shared services shuttle

Carshare within a 1/4 mile:

City CarShare

north berkeley bart, north berkeley bart

Zipcar

north berkeley bart

Carshare within a 1/2 mile:

City CarShare

allston & jefferson

Zipcar

university ave\bonar st - shell station, university ave\sacramento st - chevron

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).

To explain terms or see tool tip text, [go to the glossary](#).



Connect project report



North Berkeley BART Station

URL: <https://connect.greentrip.org/map-tool.php?p=316234>

Prepared by: 20201202 Nina Rizzo

Project status: Conceptual

Additional project info: Scenario with TDM and BMR.

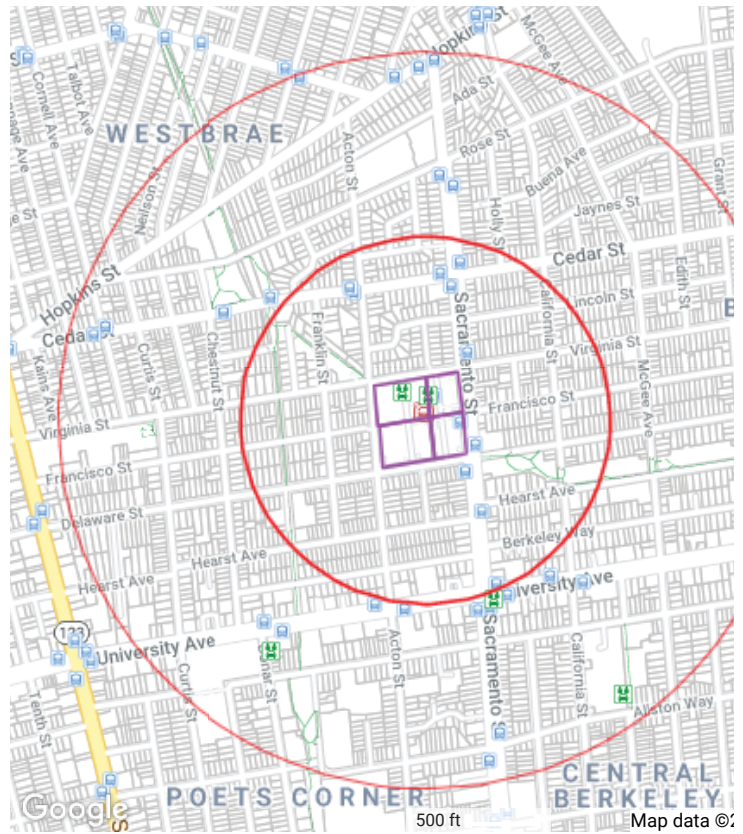
Assumptions: Refer to Task 4.2 report.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **26,146 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **72% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **55% less** parking use every **day** compared to the MTC/ABAG average.
- **\$2,180** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$-27,950,000** in parking construction cost if built with **0.50** instead of the municipal requirement of **spaces/unit**.
- **Saving 208,134 sq.ft.** in parking spaces which could be allocated to **279 housing units of 747 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **1119 units**
 Parking proposed: **559 spaces**
 Density: **137.89 units/acre**
 Parking ratio: **0.50 spaces/unit**

**GreenTRIP
 certification
 ready?**



Yes

[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	32.58	17.01	1.13
if built on selected parcel	20.06	10.47	0.7
with affordable housing	17.17	8.96	0.69
with GreenTRIP strategies	9.21	4.81	0.51
Your project	9.21	4.81	0.51

\$2,180

Resident savings from selected GreenTRIP strategies per year/unit

\$-27,950,000

lost on parking compared to municipal parking requirement of spaces/unit, or spaces total.

 72% Less driving 23.37 Fewer miles per year	 72% Less climate impact 12.2 Fewer CO ₂ per year	 55% Less parking used 0.62 Fewer parking spaces used
--	--	---

Total driving and climate impacts compared to MTC/ABAG average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

*All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
67 Studio	470	\$2,062
560 1 BR	660	\$2,062
425 2 BR	850	\$2,650
67 3+ BR	1,100	\$2,650
1,119 Total	747	\$2,321

Total acres: 8.12

Dwelling units per acre: 137.89

Bedrooms per acre: 206.78

Parking





Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
559 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--
559 Total		

Used spaces per dwelling unit: 0.50

Used spaces per bedroom: 0.34

Charge for parking per month: \$100

GreenTRIP strategies

	Household value per year
 Resident transit passes	
Two per unit	\$85
 Car sharing memberships	
Two per unit	\$70
 Bike sharing memberships	
none	\$0
	<hr/>
	\$2,180
 Unbundled parking	
\$100 per month for residents or for public use	

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

Affordable housing

279 Very low-income (BMR 31-50% AMI)
280 Low-income (BMR 51-80%)

Connect project report (page 4)



Nearby transportation

Transit within a 1/4 mile:

AC Transit

604, 800, 51b, fs, 688, 52

Bay Area Rapid Transit

fremont - richmond, richmond - daly city/millbrae

Bear Transit - UC Berkeley Shuttle - Night

shared services shuttle

Transit within a 1/2 mile:

AC Transit

88, 604, j, 25, 800, 51b, fs, h, 688, 52

Bay Area Rapid Transit

fremont - richmond, richmond - daly city/millbrae

Bear Transit - UC Berkeley Shuttle - Night

shared services shuttle

Carshare within a 1/4 mile:

City CarShare

north berkeley bart, north berkeley bart

Zipcar

north berkeley bart

Carshare within a 1/2 mile:

City CarShare

allston & jefferson

Zipcar

university ave\bonar st - shell station, university ave\sacramento st - chevron

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).

To explain terms or see tool tip text, [go to the glossary](#).



Connect project report



Ashby BART station

URL: [Generate link https://connect.greentrip.org/map-tool.php?p=316363](https://connect.greentrip.org/map-tool.php?p=316363)

Prepared by: 20201203 Nina Rizzo

Project status: Conceptual

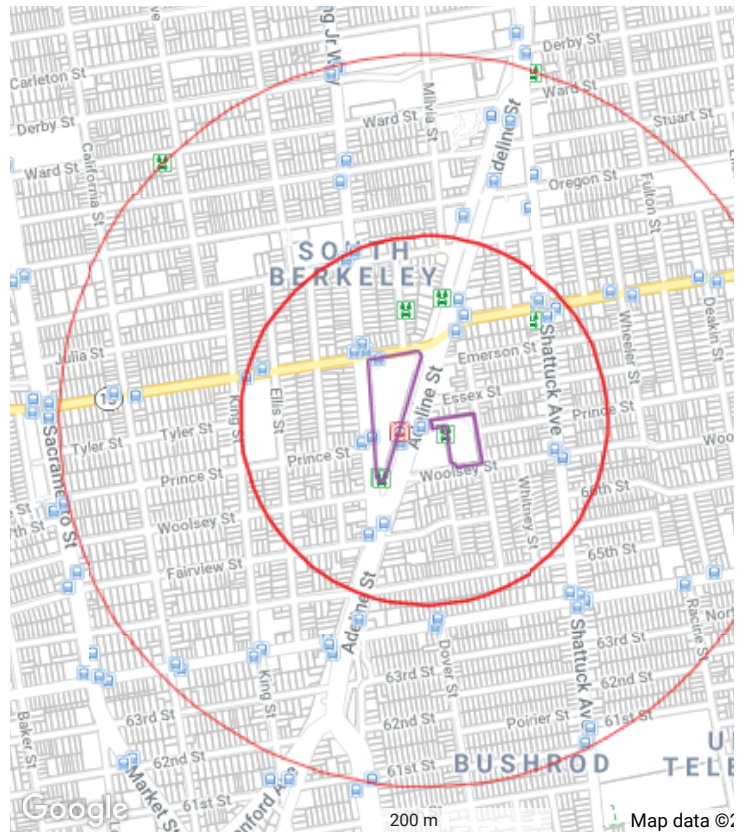
Additional project info: Assumptions per Task 4.2 report. No BMR or TDM this scenario.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **7,536 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **32% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **16% less** parking use every **day** compared to the MTC/ABAG average.
- **\$0** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$-16,975,000** in parking construction cost if built with **0.95** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 40,770 sq.ft.** in parking spaces which could be allocated to **55 housing units of 747 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **755 units**
 Parking proposed: **717 spaces**
 Density: **120.05 units/acre**
 Parking ratio: **0.95 spaces/unit**

**GreenTRIP
 certification
 ready?**



Almost

[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	30.99	16.18	1.13
if built on selected parcel	21.01	10.97	0.95
with affordable housing	--	--	--
with GreenTRIP strategies	--	--	--
Your project	21.01	10.97	0.95

\$0 Resident savings from selected GreenTRIP strategies per year/household

\$-16,975,000 Cost on parking compared to municipal parking requirement of **.5** spaces/unit, or **378** spaces total.

 32% Less driving 9.98 Fewer miles per year	 32% Less climate impact 5.21 Fewer CO ₂ per year	 16% Less parking used 0.18 Fewer parking spaces used
---	--	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

*All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

 **Building**

Units	Avg. sq. ft.	Avg. rent (\$/mo)
45 Studio	470	\$2,062
378 1 BR	660	\$2,062
287 2 BR	850	\$2,650
45 3+ BR	1,100	\$2,650
755 Total	747	\$2,321

Total acres: 6.29

Dwelling units per acre: 120.05

Bedrooms per acre: 180.00

 **Parking**

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
717 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--





717 Total

Used spaces per dwelling unit: 0.95

Used spaces per bedroom: 0.63

Charge for parking per month: none

**GreenTRIP strategies**

	Household value per year
 Resident transit passes <i>none</i>	\$0
 Car sharing memberships <i>none</i>	\$0
 Bike sharing memberships <i>none</i>	\$0
	\$0
 Unbundled parking \$0 per month for residents or for public use	

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

 **Affordable housing**

none

Connect project report (page 4)



Nearby transportation

Transit within a 1/4 mile:

AC Transit

12, 800, 49, f, 18

Bay Area Rapid Transit

fremont - richmond, richmond - daly city/millbrae

Transit within a 1/2 mile:

AC Transit

12, 800, 49, f, 18, 688

Bay Area Rapid Transit

fremont - richmond, richmond - daly city/millbrae

Carshare within a 1/4 mile:

City CarShare

adeline & essex (ed roberts campus accessmobile), ashby bart, otis & ashby

Zipcar

adeline st\russell st, ashby bart, shattuck ave\ashby ave

Carshare within a 1/2 mile:

City CarShare

shattuck & adeline (uc storage), ward & mcgee

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).

To explain terms or see tool tip text, [go to the glossary](#).



Connect project report



Ashby BART station

URL: <https://connect.greentrip.org/map-tool.php?p=316320>

Prepared by: 20201203 Nina Rizzo

Project status: Conceptual

Additional project info: Assumptions per Task 4.2 report.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **16,928 fewer** miles driven every **day** compared to the **MTC/ABAG** average.
- **72% fewer** GHG impacts every **day** compared to the **MTC/ABAG** average.
- **56% less** parking use every **day** compared to the **MTC/ABAG** average.
- **\$2,180** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$75,000** in parking construction cost if built with **0.50** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 142,695 sq.ft.** in parking spaces which could be allocated to **191 housing units of 747 sq.ft.**



Transit Markers

-  Bus
-  Carshare
-  Bus rapid transit
-  Subway, metro
-  Rail
-  Tram, streetcar, light rail
-  Cable car, funicular
-  Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **755 units**
 Parking proposed: **376 spaces**
 Density: **120.05 units/acre**
 Parking ratio: **0.50 spaces/unit**

**GreenTRIP
 certification
 ready?**



Yes

[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	30.99	16.18	1.13
if built on selected parcel	18.76	9.79	0.7
with affordable housing	15.62	8.15	0.69
with GreenTRIP strategies	8.57	4.47	0.5
Your project	8.57	4.47	0.5

\$2,180 Resident savings from selected GreenTRIP strategies per year/household

\$75,000 Saved on parking compared to municipal parking requirement of **.5** spaces/unit, or **378** spaces total.

72%
 Less driving
22.42
 Fewer miles per year

72%
 Less climate impact
11.7
 Fewer CO₂ per year

56%
 Less parking used
0.63
 Fewer parking spaces used

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

*All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
45 Studio	470	\$2,062
378 1 BR	660	\$2,062
287 2 BR	850	\$2,650
45 3+ BR	1,100	\$2,650
755 Total	747	\$2,321





Total acres: 6.29
 Dwelling units per acre: 120.05
 Bedrooms per acre: 180.00

Parking

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
376 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--

376 Total
 Used spaces per dwelling unit: 0.50
 Used spaces per bedroom: 0.34
 Charge for parking per month: \$100

GreenTRIP strategies

	Household value per year
 Resident transit passes Two per unit	\$85
 Car sharing memberships Two per unit	\$70
 Bike sharing memberships none	\$0
	\$2,180
 Unbundled parking \$100 per month for residents or for public use	

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

Affordable housing

188 Very low-income (BMR 31-50% AMI)
 189 Low-income (BMR 51-80%)

Connect project report (page 4)



Nearby transportation

Transit within a 1/4 mile:

AC Transit

12, 800, 49, f, 18

Bay Area Rapid Transit

fremont - richmond, richmond - daly city/millbrae

Transit within a 1/2 mile:

AC Transit

12, 800, 49, f, 18, 688

Bay Area Rapid Transit

fremont - richmond, richmond - daly city/millbrae

Carshare within a 1/4 mile:

City CarShare

adeline & essex (ed roberts campus accessmobile), ashby bart, otis & ashby

Zipcar

adeline st\russell st, ashby bart, shattuck ave\ashby ave

Carshare within a 1/2 mile:

City CarShare

shattuck & adeline (uc storage), ward & mcgee

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).

To explain terms or see tool tip text, [go to the glossary](#).



Connect project report



Rockridge BART station

URL: [Generate link https://connect.greentrip.org/map-tool.php?p=317696](https://connect.greentrip.org/map-tool.php?p=317696)

Prepared by: 20201203 Nina Rizzo

Project status: Conceptual

Additional project info: Assumptions per Task 4.2 report. No BMR or TDM.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **1,693 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **19% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **18% less** parking use every **day** compared to the MTC/ABAG average.
- **\$0** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$1,000,000** in parking construction cost if built with **0.93** instead of the municipal requirement of **1 spaces/unit**.
- **Saving 17,892 sq.ft.** in parking spaces which could be allocated to **24 housing units of 747 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **284 units**
 Parking proposed: **264 spaces**
 Density: **230.89 units/acre**
 Parking ratio: **0.93 spaces/unit**

GreenTRIP certification ready?



Get started
[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	30.99	16.18	1.14
if built on selected parcel	25.03	13.07	0.93
with affordable housing	--	--	--
with GreenTRIP strategies	--	--	--
Your project	25.03	13.07	0.93

\$0 Resident savings from selected GreenTRIP strategies per year/household

\$1,000,000 Saved on parking compared to municipal parking requirement of **1** spaces/unit, or **284** spaces total.

 19% Less driving 5.96 Fewer miles per year	 19% Less climate impact 3.11 Fewer CO ₂ per year	 18% Less parking used 0.21 Fewer parking spaces used
---	--	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

* All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
17 Studio	470	\$2,062
142 1 BR	660	\$2,062
108 2 BR	850	\$2,650
17 3+ BR	1,100	\$2,650
284 Total	747	\$2,321





Total acres: 1.23
 Dwelling units per acre: 230.89
 Bedrooms per acre: 346.34

Parking

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
264 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--

264 Total
 Used spaces per dwelling unit: 0.93
 Used spaces per bedroom: 0.62
 Charge for parking per month: none

GreenTRIP strategies

	Household value per year
 Resident transit passes <i>none</i>	\$0
 Car sharing memberships <i>none</i>	\$0
 Bike sharing memberships <i>none</i>	\$0
	\$0
 Unbundled parking \$0 per month for residents or for public use	\$0

Affordable housing

none

Average cost of owning and operating a vehicle \$8,698/yr according to AAA



Connect project report



Rockridge BART station

URL: <https://connect.greentrip.org/map-tool.php?p=317739>

Prepared by: 20201203 Nina Rizzo

Project status: Conceptual

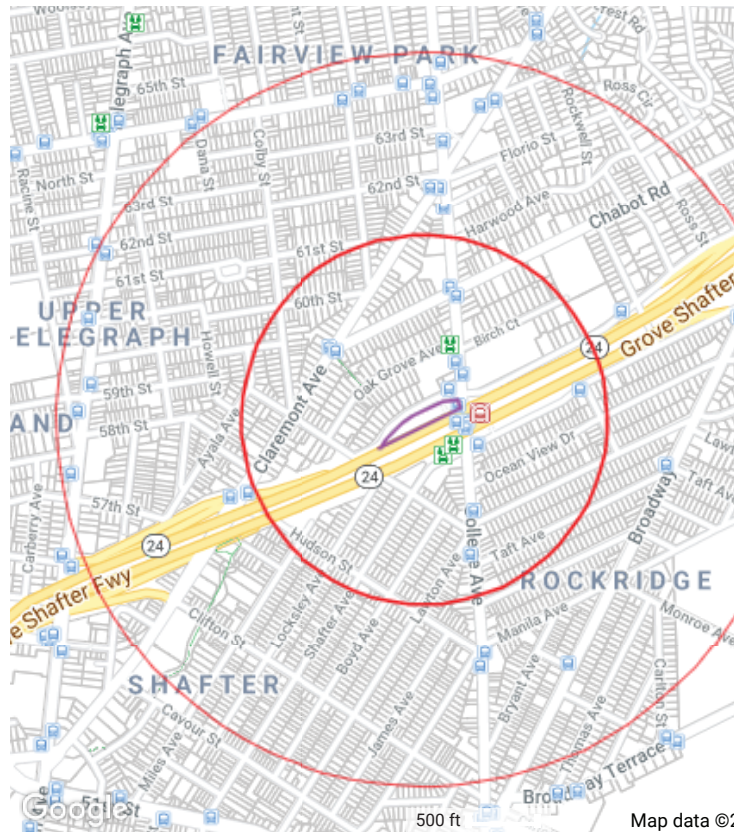
Additional project info: Assumptions per Task 4.2 report.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **5,900 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **67% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **48% less** parking use every **day** compared to the MTC/ABAG average.
- **\$960** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$0** in parking construction cost if built with **0.50** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 46,860 sq.ft.** in parking spaces which could be allocated to **63 housing units of 747 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **284 units**
 Parking proposed: **142 spaces**
 Density: **230.89 units/acre**
 Parking ratio: **0.50 spaces/unit**

**GreenTRIP
 certification
 ready?**



Get started
[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	30.99	16.18	1.14
if built on selected parcel	22.57	11.78	0.7
with affordable housing	16.26	8.49	0.68
with GreenTRIP strategies	10.22	5.33	0.59
Your project	10.22	5.33	0.59

\$960 Resident savings from selected GreenTRIP strategies per year/household

\$0 Lost on parking compared to municipal parking requirement of **.5** spaces/unit, or **142** spaces total.

 67% Less driving 20.77 Fewer miles per year	 67% Less climate impact 10.84 Fewer CO ₂ per year	 48% Less parking used 0.55 Fewer parking spaces used
--	---	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

* All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

 **Building**

Units	Avg. sq. ft.	Avg. rent (\$/mo)
17 Studio	470	\$2,062
142 1 BR	660	\$2,062
108 2 BR	850	\$2,650
17 3+ BR	1,100	\$2,650
284 Total	747	\$2,321

Total acres: 1.23

Dwelling units per acre: 230.89

Bedrooms per acre: 346.34

 **Parking**

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
142 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--





142 Total

Used spaces per dwelling unit: 0.50

Used spaces per bedroom: 0.39

Charge for parking per month: none

**GreenTRIP strategies**

	Household value per year
 Resident transit passes One per unit	\$75
 Car sharing memberships One per unit	\$60
 Bike sharing memberships none	\$0
	\$960
 Unbundled parking \$0 per month for residents or for public use	

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

 **Affordable housing**

142 Very low-income (BMR 31-50% AMI)
142 Low-income (BMR 51-80%)

Connect project report (page 4)

**Nearby transportation****Transit within a 1/4 mile:****AC Transit**

822, 605, 851, 51b, 49, 51a, e, 688

Bay Area Rapid Transit

pittsburg/bay point - sfia/millbrae

Transit within a 1/2 mile:**AC Transit**

822, 1, 605, 851, 800, 51b, 49, 51a, e, 688, 1r

Bay Area Rapid Transit

pittsburg/bay point - sfia/millbrae

Carshare within a 1/4 mile:**City CarShare**

oak grove & college, rockridge bart

Zipcar

rockridge bart

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).

To explain terms or see tool tip text, [go to the glossary](#).



Connect project report



Fruitvale BART station

URL: [Generate link https://connect.greentrip.org/map-tool.php?p=320491](https://connect.greentrip.org/map-tool.php?p=320491)

Prepared by: 20201204 Nina Rizzo

Project status: Conceptual

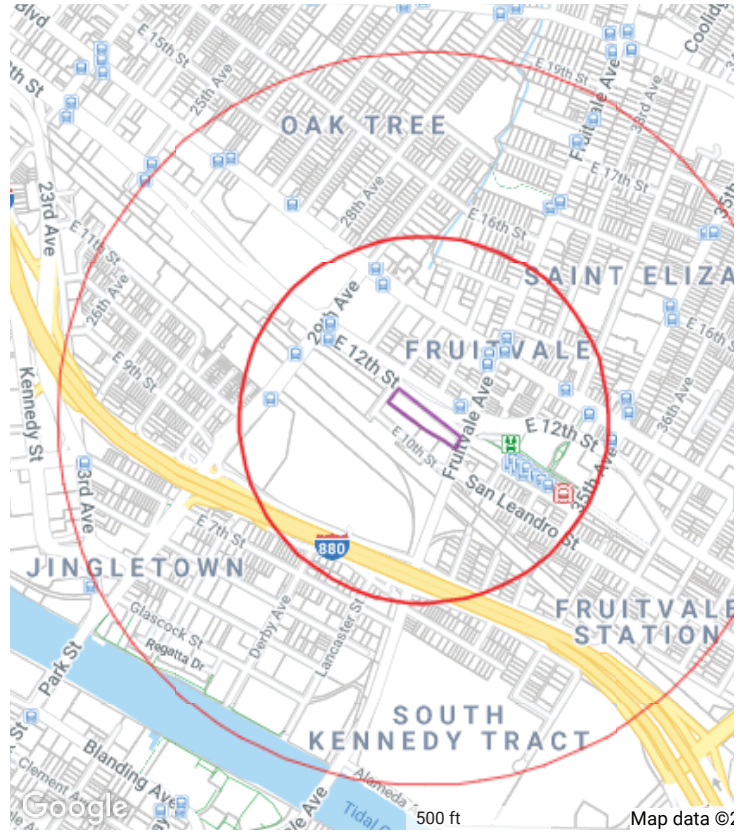
Additional project info: Assumptions per Task 4.2 report. No TDM or BMR.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **4,194 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **27% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **18% less** parking use every **day** compared to the MTC/ABAG average.
- **\$0** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$-10,600,000** in parking construction cost if built with **0.93** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 31,122 sq.ft.** in parking spaces which could be allocated to **42 housing units of 748 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **494 units**
 Parking proposed: **459 spaces**
 Density: **341.16 units/acre**
 Parking ratio: **0.93 spaces/unit**

GreenTRIP certification ready?



Get started
[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	31.01	16.19	1.14
if built on selected parcel	22.52	11.76	0.93
with affordable housing	--	--	--
with GreenTRIP strategies	--	--	--
Your project	22.52	11.76	0.93

\$0 Resident savings from selected GreenTRIP strategies per year/household

\$-10,600,000 Lost on parking compared to municipal parking requirement of **.5** spaces/unit, or **247** spaces total.

 27% Less driving 8.49 Fewer miles per year	 27% Less climate impact 4.43 Fewer CO ₂ per year	 18% Less parking used 0.21 Fewer parking spaces used
---	--	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

* All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 4)

**Nearby transportation****Transit within a 1/4 mile:****AC Transit**

14, 1, 20, 21, 339, 47, 54, 655, 648, 654, 39, 851, 801, 51a, o, 1r, 62

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, fremont - richmond

Transit within a 1/2 mile:**AC Transit**

14, 1, 20, 21, 339, 47, 54, 655, 648, 654, 39, 851, 801, 51a, ox, o, 1r, 62

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, fremont - richmond

Carshare within a 1/4 mile:**City CarShare**

fruitvale bart

NOTE: This report does not imply that this project has received a GreenTRIP Certification.
For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).
To explain terms or see tool tip text, [go to the glossary](#).



Connect
Traffic and Climate Calculator for Housing

Connect project report



Fruitvale BART station

URL: <https://connect.greentrip.org/map-tool.php?p=320534>

Prepared by: 20201204 Nina Rizzo

Project status: Conceptual

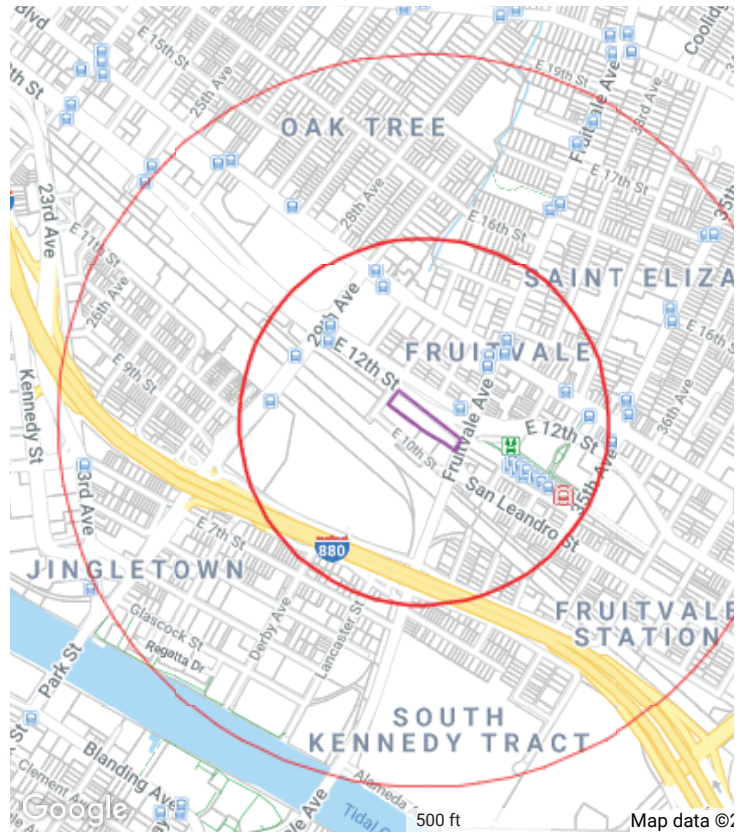
Additional project info: Assumptions per Task 4.2 report. With TDM and BMR.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **9,559 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **62% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **56% less** parking use every **day** compared to the MTC/ABAG average.
- **\$1,860** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$0** in parking construction cost if built with **0.50** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 94,848 sq.ft.** in parking spaces **which could be allocated to 127 housing units of 748 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **494 units**
 Parking proposed: **247 spaces**
 Density: **341.16 units/acre**
 Parking ratio: **0.50 spaces/unit**

GreenTRIP certification ready?



Get started
[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	31.01	16.19	1.14
if built on selected parcel	20.3	10.6	0.7
with affordable housing	19.04	9.94	0.69
with GreenTRIP strategies	11.66	6.09	0.5
Your project	11.66	6.09	0.5

\$1,860 Resident savings from selected GreenTRIP strategies per year/household

\$0 Lost on parking compared to municipal parking requirement of **.5** spaces/unit, or **247** spaces total.

<p>62% Less driving 19.35 Fewer miles per year</p>	<p>62% Less climate impact 10.1 Fewer CO₂ per year</p>	<p>56% Less parking used 0.64 Fewer parking spaces used</p>
--	---	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

* All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
29 Studio	470	\$2,062
247 1 BR	660	\$2,062
188 2 BR	850	\$2,650
30 3+ BR	1,100	\$2,650
494 Total	748	\$2,321





Total acres: 1.45
 Dwelling units per acre: 341.16
 Bedrooms per acre: 512.43

Parking

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
247 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--

247 Total
 Used spaces per dwelling unit: 0.50
 Used spaces per bedroom: 0.34
 Charge for parking per month: \$100

GreenTRIP strategies

	Household value per year
 Resident transit passes	
Two per unit	\$75
 Car sharing memberships	
One per unit	\$60
 Bike sharing memberships	
none	\$0
	<hr/>
	\$1,860
 Unbundled parking	
\$100 per month for residents or for public use	

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

Affordable housing

49 Very low-income (BMR 31-50% AMI)
 50 Low-income (BMR 51-80%)

Connect project report (page 4)

**Nearby transportation****Transit within a 1/4 mile:****AC Transit**

14, 1, 20, 21, 339, 47, 54, 655, 648, 654, 39, 851, 801, 51a, o, 1r, 62

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, fremont - richmond

Transit within a 1/2 mile:**AC Transit**

14, 1, 20, 21, 339, 47, 54, 655, 648, 654, 39, 851, 801, 51a, ox, o, 1r, 62

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, fremont - richmond

Carshare within a 1/4 mile:**City CarShare**

fruitvale bart

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).

To explain terms or see tool tip text, [go to the glossary](#).



Connect project report



San Leandro BART Station

URL: [Generate link https://connect.greentrip.org/map-tool.php?p=317782](https://connect.greentrip.org/map-tool.php?p=317782)

Prepared by: 20201204 Nina Rizzo

Project status: Conceptual

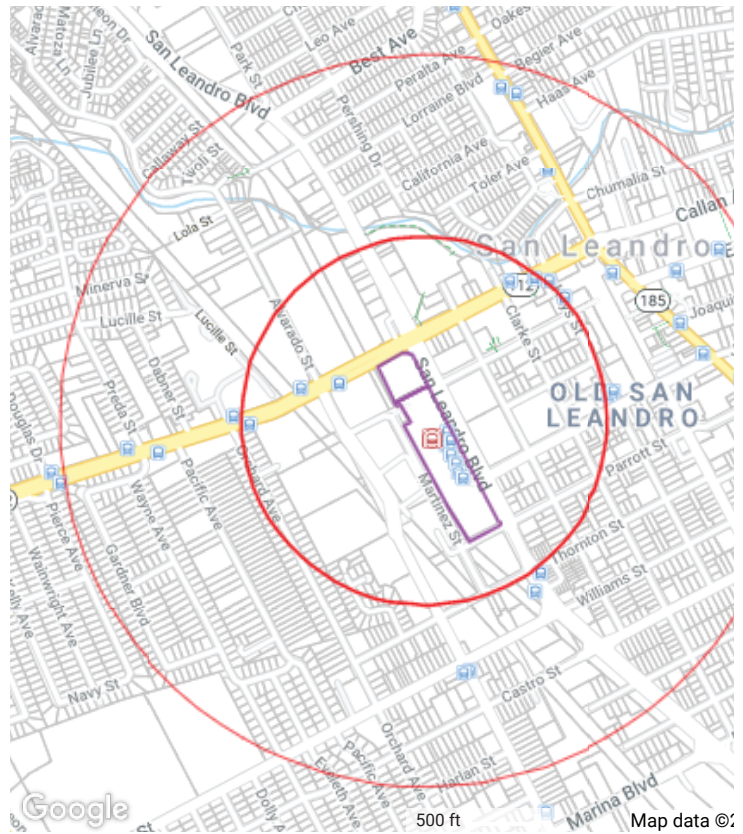
Additional project info: Assumptions per Task 4.2 report. No TDM or BMR.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **5,628 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **14% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **13% less** parking use every **day** compared to the MTC/ABAG average.
- **\$0** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$-28,975,000** in parking construction cost if built with **0.98** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 54,315 sq.ft.** in parking spaces which could be allocated to **73 housing units of 747 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **1207 units**
 Parking proposed: **1183 spaces**
 Density: **136.88 units/acre**
 Parking ratio: **0.98 spaces/unit**

GreenTRIP certification ready?



Get started
[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	32.58	17.01	1.13
if built on selected parcel	27.92	14.57	0.98
with affordable housing	--	--	--
with GreenTRIP strategies	--	--	--
Your project	27.92	14.57	0.98

\$0 Resident savings from selected GreenTRIP strategies per year/household

\$-28,975,000 Lost on parking compared to municipal parking requirement of **.5** spaces/unit, or **604** spaces total.

 14% Less driving 4.66 Fewer miles per year	 14% Less climate impact 2.43 Fewer CO ₂ per year	 13% Less parking used 0.15 Fewer parking spaces used
---	--	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

* All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
72 Studio	470	\$2,062
604 1 BR	660	\$2,062
459 2 BR	850	\$2,650
72 3+ BR	1,100	\$2,650
1,207 Total	747	\$2,321





Total acres: 8.82
 Dwelling units per acre: 136.88
 Bedrooms per acre: 205.26

Parking

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
1,183 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--

1183 Total
 Used spaces per dwelling unit: 0.98
 Used spaces per bedroom: 0.65
 Charge for parking per month: none

GreenTRIP strategies

	Household value per year
 Resident transit passes <i>none</i>	\$0
 Car sharing memberships <i>none</i>	\$0
 Bike sharing memberships <i>none</i>	\$0
 Unbundled parking \$0 per month for residents or for public use	\$0

Affordable housing

none

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

Connect project report (page 4)



Nearby transportation

Transit within a 1/4 mile:

AC Transit

1, 75, 801, 89, 85

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, fremont - richmond

Transit within a 1/2 mile:

AC Transit

1, 75, 801, 89, 85, 1r

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, fremont - richmond

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).

To explain terms or see tool tip text, [go to the glossary](#).



Connect project report



San Leandro BART Station

URL: <https://connect.greentrip.org/map-tool.php?p=317825>

Prepared by: 20201204 Nina Rizzo

Project status: Conceptual

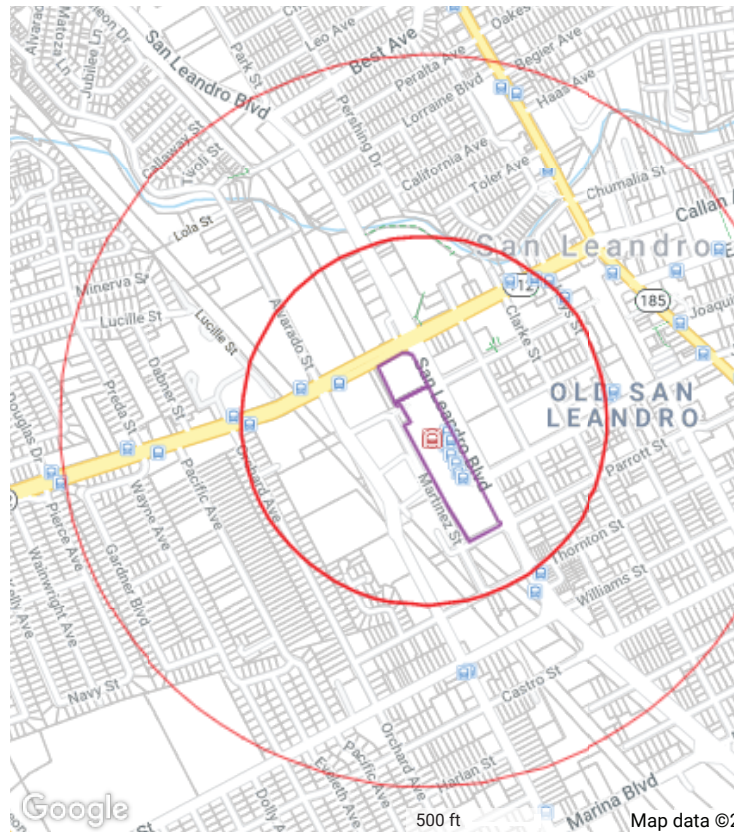
Additional project info: Assumptions per Task 4.2 report. With TDM and BMR.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **22,735 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **58% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **53% less** parking use every **day** compared to the MTC/ABAG average.
- **\$1,860** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$-25,000** in parking construction cost if built with **0.50** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 217,260 sq.ft.** in parking spaces which could be allocated to **291 housing units of 747 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **1207 units**
 Parking proposed: **604 spaces**
 Density: **136.88 units/acre**
 Parking ratio: **0.50 spaces/unit**

**GreenTRIP
 certification
 ready?**



Get started
[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	32.58	17.01	1.13
if built on selected parcel	24.59	12.84	0.72
with affordable housing	22.57	11.78	0.72
with GreenTRIP strategies	13.74	7.17	0.53
Your project	13.74	7.17	0.53

\$1,860

Resident savings from selected GreenTRIP strategies per year/household

\$-25,000

Lost on parking compared to municipal parking requirement of **.5** spaces/unit, or **604** spaces total.



58%
 Less driving
18.84
 Fewer miles per year



58%
 Less climate impact
9.83
 Fewer CO₂ per year



53%
 Less parking used
0.6
 Fewer parking spaces used

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

* All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
72 Studio	470	\$2,062
604 1 BR	660	\$2,062
459 2 BR	850	\$2,650
72 3+ BR	1,100	\$2,650
1,207 Total	747	\$2,321





Total acres: 8.82
 Dwelling units per acre: 136.88
 Bedrooms per acre: 205.26

Parking

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
604 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--

604 Total
 Used spaces per dwelling unit: 0.50
 Used spaces per bedroom: 0.35
 Charge for parking per month: \$100

GreenTRIP strategies

	Household value per year
 Resident transit passes	
Two per unit	\$75
 Car sharing memberships	
One per unit	\$60
 Bike sharing memberships	
none	\$0
	<hr/>
	\$1,860
 Unbundled parking	
\$100 per month for residents or for public use	

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

Affordable housing

211 Very low-income (BMR 31-50% AMI)
 211 Low-income (BMR 51-80%)

Connect project report (page 4)



Nearby transportation

Transit within a 1/4 mile:

AC Transit

1, 75, 801, 89, 85

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, fremont - richmond

Transit within a 1/2 mile:

AC Transit

1, 75, 801, 89, 85, 1r

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, fremont - richmond

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

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To explain terms or see tool tip text, [go to the glossary](#).


Connect

Traffic and Climate Calculator for Housing

Connect project report



Glen Park BART station

URL: [Generate link](https://connect.greentrip.org/map-tool.php?p=320577) <https://connect.greentrip.org/map-tool.php?p=320577>

Prepared by: 20201204 Nina Rizzo

Project status: Conceptual

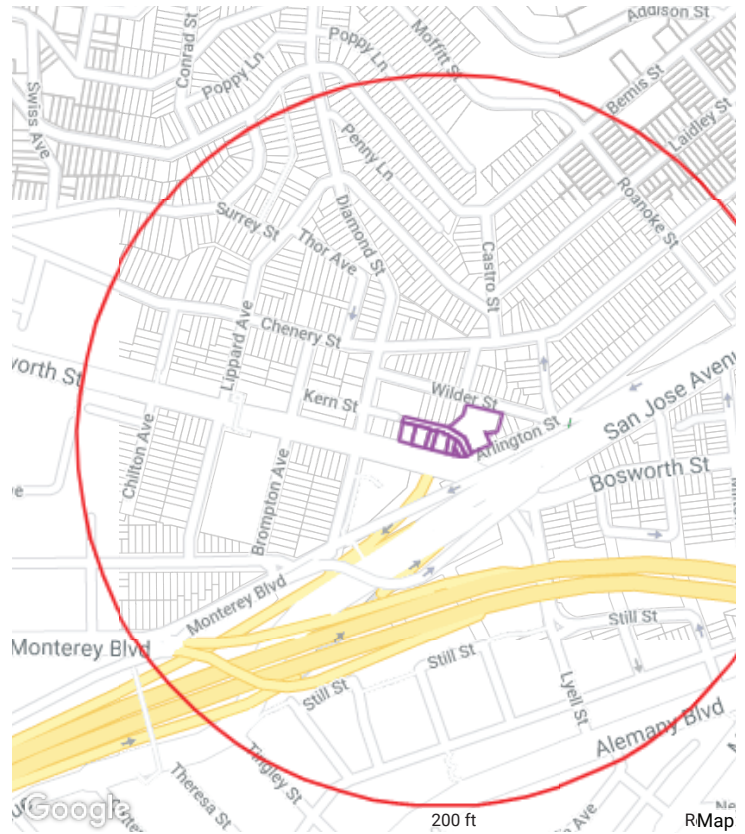
Additional project info: Assumptions per BART TOD Workplan August 2020 Draft, Technical Appendix.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **1,371 fewer** miles driven every **day** compared to the MTC/ABAG average.
- **36% fewer** GHG impacts every **day** compared to the MTC/ABAG average.
- **26% less** parking use every **day** compared to the MTC/ABAG average.
- **\$0** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$-2,200,000** in parking construction cost if built with **0.84** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 11,136 sq.ft.** in parking spaces which could be allocated to **16 housing units of 682 sq.ft.**



Transit Markers

- Bus
- Carshare
- Bus rapid transit
- Subway, metro
- Rail
- Tram, streetcar, light rail
- Cable car, funicular
- Ferry

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **128 units**
 Parking proposed: **108 spaces**
 Density: **141.91 units/acre**
 Parking ratio: **0.84 spaces/unit**

GreenTRIP certification ready?



Get started
[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	29.77	16.29	1.13
if built on selected parcel	19.06	10.43	0.84
with affordable housing	--	--	--
with GreenTRIP strategies	--	--	--
Your project	19.06	10.43	0.84

\$0 Resident savings from selected GreenTRIP strategies per year/household

\$-2,200,000 Lost on parking compared to municipal parking requirement of **.5** spaces/unit, or **64** spaces total.

 36% Less driving 10.71 Fewer miles per year	 36% Less climate impact 5.86 Fewer CO ₂ per year	 26% Less parking used 0.29 Fewer parking spaces used
--	--	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

* All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
33 Studio	470	\$2,437
59 1 BR	660	\$2,786
27 2 BR	850	\$2,786
9 3+ BR	1,100	\$3,134
128 Total	682	\$2,720





Total acres: 0.90
 Dwelling units per acre: 141.91
 Bedrooms per acre: 191.80

Parking

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
108 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--

108 Total
 Used spaces per dwelling unit: 0.84
 Used spaces per bedroom: 0.62
 Charge for parking per month: none

GreenTRIP strategies

	Household value per year
 Resident transit passes <i>none</i>	\$0
 Car sharing memberships <i>none</i>	\$0
 Bike sharing memberships <i>none</i>	\$0
	\$0
 Unbundled parking \$0 per month for residents or for public use	\$0

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

Affordable housing

none

Connect project report (page 4)



Nearby transportation

Transit within a 1/4 mile:

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, pittsburg/bay point - sfa/millbrae, richmond - daly city/millbrae

San Francisco Municipal Transportation Agency

j, 35, 52, 23, 44, 36

Transit within a 1/2 mile:

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, pittsburg/bay point - sfa/millbrae, richmond - daly city/millbrae

San Francisco Municipal Transportation Agency

j, 35, 52, 14, 14x, 14r, 23, 44, 36, 49

Carshare within a 1/4 mile:

City CarShare

bosworth & brompton (on-street), glen park bart

Zipcar

bosworth st\brompton ave (on-street), diamond st\bosworth st, glen park bart

Carshare within a 1/2 mile:

Zipcar

chenery st\whitney st, mission st\cotter st, mission st\ney st - 76 gas station

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

For more resources related to traffic reduction strategies, smart growth, and parking, please visit our [additional resources page](#).

To explain terms or see tool tip text, [go to the glossary](#).



Connect project report



Glen Park BART station

URL: [Generate link https://connect.greentrip.org/map-tool.php?p=320620](https://connect.greentrip.org/map-tool.php?p=320620)

Prepared by: 20201204 Nina Rizzo

Project status: Conceptual

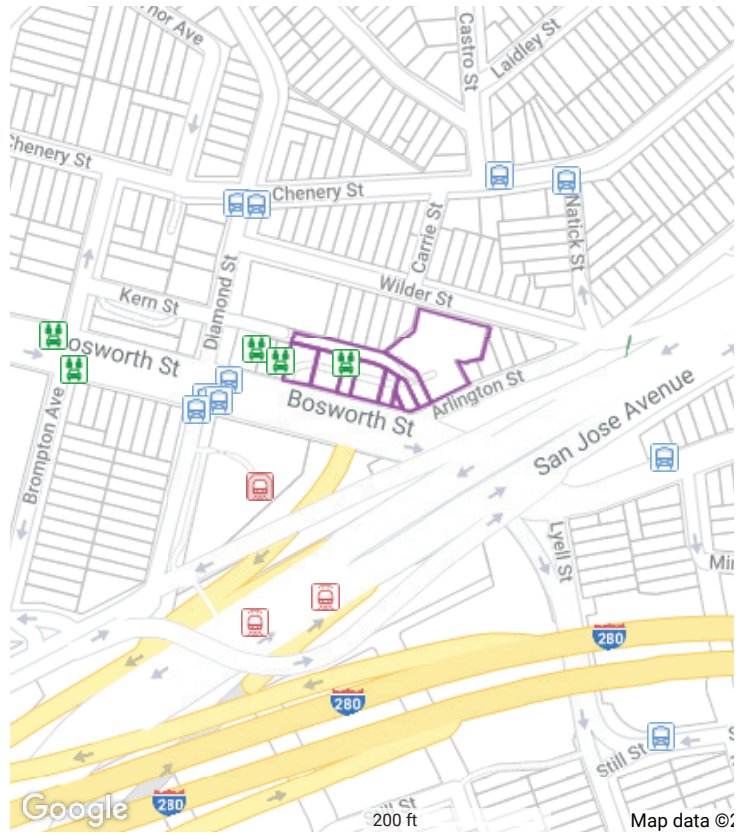
Additional project info: Assumptions per BART TOD Workplan August 2020 Draft, Technical Appendix. With TDM and BMR.

GreenTRIP Connect (Connect.GreenTRIP.org) is a free, online tool that models traffic and greenhouse gas impacts of a residential project in California. Based on the project's location, unit count, unit mix, rent, parking supply, and traffic reduction strategies, this project will result in:

- **2,988 fewer** miles driven every **day** compared to the **MTC/ABAG** average.
- **78% fewer** GHG impacts every **day** compared to the **MTC/ABAG** average.
- **52% less** parking use every **day** compared to the **MTC/ABAG** average.
- **\$1,860** in transportation savings for future residents.

Parking when compared to Municipal requirements:

- **Saving \$0** in parking construction cost if built with **0.50** instead of the municipal requirement of **.5 spaces/unit**.
- **Saving 22,656 sq.ft.** in parking spaces which could be allocated to **33 housing units of 682 sq.ft.**



Transit Markers

- Bus Carshare Bus rapid transit *Click icons for stop*
- Subway, metro Rail Tram, streetcar, light rail
- Cable car, funicular Ferry *information*

Connect project report (page 2)

GreenTRIP Connect dashboard for your project

Project characteristics

Building: **128 units**
 Parking proposed: **64 spaces**
 Density: **141.91 units/acre**
 Parking ratio: **0.50 spaces/unit**

GreenTRIP certification ready?



Get started
[See requirements](#)

Comparison snapshot

showing: per unit, per day

	Driving miles/day	Greenhouse gases kg CO ₂ /day	Parking spaces predicted use
if built in an average location* in:			
MTC/ABAG	29.77	16.29	1.13
if built on selected parcel	17.94	9.81	0.65
with affordable housing	10.52	5.75	0.63
with GreenTRIP strategies	6.43	3.52	0.54
Your project	6.43	3.52	0.54

\$1,860 Resident savings from selected GreenTRIP strategies per year/household

\$0 Lost on parking compared to municipal parking requirement of **.5** spaces/unit, or **64** spaces total.

 78% Less driving 23.34 Fewer miles per year	 78% Less climate impact 12.77 Fewer CO ₂ per year	 52% Less parking used 0.59 Fewer parking spaces used
--	---	---

Total driving and climate impacts compared to **MTC/ABAG** average.

Note: Certifications are currently only offered in the San Francisco Bay Area (defined by the boundaries of MTC).

* All "average location" buildings are given 1.2 spaces per unit. (This ratio is the lower end of the Institute for Transportation Engineers guidance for parking in multiunit buildings.) To learn more about the Connect tool methodology please [click here](#).

Connect project report (page 3)

Building

Units	Avg. sq. ft.	Avg. rent (\$/mo)
33 Studio	470	\$2,437
59 1 BR	660	\$2,786
27 2 BR	850	\$2,786
9 3+ BR	1,100	\$3,134
128 Total	682	\$2,720





Total acres: 0.90
 Dwelling units per acre: 141.91
 Bedrooms per acre: 191.80

Parking

Spaces	Construction cost per space	Maintenance cost per space (\$/mo)
0 Surface	--	--
64 Garage/structure	\$50,000	\$175
0 Underground garage	--	--
0 Lifts	--	--
0 Tandem	--	--
0 Bike	--	--

64 Total
 Used spaces per dwelling unit: 0.50
 Used spaces per bedroom: 0.39
 Charge for parking per month: none

GreenTRIP strategies

	Household value per year
 Resident transit passes	
Two per unit	\$75
 Car sharing memberships	
One per unit	\$60
 Bike sharing memberships	
none	\$0
	<hr/>
	\$1,860
 Unbundled parking	
\$0 per month for residents or for public use	

Average cost of owning and operating a vehicle \$8,698/yr according to AAA

Affordable housing

64 Very low-income (BMR 31-50% AMI)
64 Low-income (BMR 51-80%)

Connect project report (page 4)



Nearby transportation

Transit within a 1/4 mile:

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, pittsburg/bay point - sfa/millbrae, richmond - daly city/millbrae

San Francisco Municipal Transportation Agency

j, 35, 52, 23, 44, 36

Transit within a 1/2 mile:

Bay Area Rapid Transit

dublin/pleasanton - daly city, fremont - daly city, pittsburg/bay point - sfa/millbrae, richmond - daly city/millbrae

San Francisco Municipal Transportation Agency

j, 35, 52, 14, 14x, 14r, 23, 44, 36, 49

Carshare within a 1/4 mile:

City CarShare

bosworth & brompton (on-street), glen park bart

Zipcar

bosworth st\brompton ave (on-street), diamond st\bosworth st, glen park bart

Carshare within a 1/2 mile:

Zipcar

chenery st\whitney st, mission st\cotter st, mission st\ney st - 76 gas station

NOTE: This report does not imply that this project has received a GreenTRIP Certification.

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To explain terms or see tool tip text, [go to the glossary](#).

VIII. Technical Appendix

E. Mode Shift Calculation Template

Mode Shift to Sustainable Modes Based on Percent Replacement Parking

Description	Inputs/ Outputs	Formula Description	Source
Number of Patrons Who Enter the Station Daily			BART FY2019 Daily Average Entries
Percentage of Home-Origin Trips			BART 2015 Station Access Profile Survey
Total Home-Origin Trips	-	Percentage of Home-Origin Trips x Number of Patrons Who Enter the Station Daily	
Park & Ride Mode Share (home origin)			BART 2015 Station Access Profile Survey
Sustainable Access Mode Share (all home origin, non-park & ride. Includes walk, bike, transit, drop-off) Patrons who Park	-	Total Home-Origin Trips x Park & Ride Mode Share (home origin)	BART 2015 Station Access Profile Survey
Current Number of Parking Spaces			
Occupancy			BART TOD Access model
Turnover			BART TOD Access model
Percent Replacement Parking			
Parking Spaces Reduced		Current Number of Parking spaces - Percent Replacement Parking	BART
Number of Auto Boardings Reduced		Occupancy x Turnover x Parking Spaces Reduced	
Distance-Bin Percent			BART TOD Access Model
Number of Patrons that Find Another Way to the Station When Parking is Reduced		Number of Auto Boardings Reduced x Distance-Bin Percent	
New Total home-origin trips using sustainable access modes	-	(Total Home-Origin Trips x Sustainable Access Mode Share (all home origin, non-park & ride. Includes walk, bike, transit, drop-off)) + Number of Patrons that Find Another Way to the Station When Parking is Reduced	
New Percent Sustainable Mode Share		New Total home-origin trips using sustainable access modes / Total Home-Origin Trips	