Existing Conditions Report
SAN PABLO AVENUE CORRIDOR PROJECT

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SUMMARY OF FINDINGS

San Pablo Avenue is the heart of a critical travel corridor that carries tens of thousands of people every day and connects multiple communities to job and activity centers. The corridor provides north-south connections throughout the Inner East Bay. The San Pablo Avenue corridor carries local, rapid and express buses; includes high-activity pedestrian areas and commercial districts; is a bicycle route in many local jurisdiction plans; and serves as a reliever route for freeway traffic during incidents on I-80. Jurisdictions are concentrating growth along the corridor, with several higher-density, mixed-use developments recently completed and numerous others under consideration.

The San Pablo Avenue Multimodal Corridor Project is developing a long term vision for the corridor and identifying short-term projects to improve the safety and experience of all users. The effort focuses on San Pablo Avenue from downtown Oakland to Hilltop Mall/Richmond Parkway, traversing four cities in Alameda County (Oakland, Emeryville, Berkeley and Albany) and three Contra Costa County communities (El Cerrito, Richmond and the City of San Pablo).

Below are the overall highlights from the Existing Conditions report.

PRIOR STUDIES AND PLANS

- **Critical Corridor**: San Pablo Avenue is viewed by agencies and local jurisdictions alike as a critical multimodal corridor, especially for transit service and as a reliever to I-80 during incidents. In addition, for most of the cities along its length, San Pablo Avenue is a place for the economic and cultural life of their communities.
- **Rapid Bus/BRT Plans**: Nearly all of the agency-led and jurisdictional plans and studies identify San Pablo Avenue as a major transit corridor with importance to both regional and local transit service. Several of the agency-led plans include specific proposals for the future implementation of Rapid/Express Bus or Bus Rapid Transit (BRT) service.
- **I-80 Integrated Corridor Mobility (ICM)**: The I-80 ICM or East Bay SMART Corridor Program was a major cooperative effort by the California Department of Transportation (Caltrans), MTC, Alameda CTC, CCTA and 15 local agencies to alleviate congestion in the I-80 corridor. The program implemented a multimodal Advanced Transportation Management System (ATMS) from just east of the Bay Bridge Toll Plaza in Oakland to the Carquinez Bridge in Crockett. The program includes five major components: adaptive ramp metering, incident management, information to motorists regarding transit and traffic travel time, improvements along San Pablo Avenue and other arterials; and system integration.
- **Trade-offs**: The review of past planning efforts revealed that the transit service improvements envisioned for the long term by regional/county-level

and transit agencies have yet to be reconciled with the street's function as part of the Smart Corridor Project and the varying jurisdictional goals and modal and place designations. This Project will need to address the tradeoffs involved in resolving competing demands for the available public right-of-way and prioritize transportation improvements that successfully balance moderate to large scale mobility and economic development, with maintaining and enhancing a sense of place, safety, and pedestrian activity.

DEMOGRAPHICS

- **Population and Employment**: The Study Area includes approximately 74,000 households and 145,000 jobs among seven cities along the San Pablo Avenue corridor.
- **Demographics**: The relatively low income and low car ownership of households in the corridor suggest a significant transit dependent population in the Study Area.
    - **Car Ownership**: Over two-thirds of households within the Study Area own one or less autos: approximately 21% do not own an auto, and approximately 47% own a single auto.
    - **Income**: The Study Area is low-income compared to Alameda County as a whole. The average household income in the Study Area is approximately $34,000 with variation along the corridor from a low of approximately $24,000 in the City of Oakland to a high of approximately $46,000 in the City of El Cerrito.
    - **Communities of Concern**: Over half of Study Area households are within a Community of Concern (56%) and 70% of jobs are within a Community of Concern. Nearly all of Oakland and San Pablo housing and jobs are within a Community of Concern.
- **Growth**: All segments of San Pablo Avenue fall into a Priority Development Area (PDA) indicating the likelihood of significant growth. Total households are projected to grow by approximately 1.5 percent per year between 2010 and 2040 and total employment is projected to grow by approximately 1.2 percent per year between 2010 and 2040, yielding an increase of over 45,000 new households and 33,000 new jobs.

LAND USE AND ECONOMIC DEVELOPMENT

- **Land Use**: Most of the Study Area is characterized by a mix of land uses and land use intensity varies throughout the corridor. San Pablo Avenue is a vital commercial corridor for all of the jurisdictions in the Study Area, with significant existing or planned retail space throughout. There are 21 activity centers in the Study Area.
- **Development**: Most of the cities' land use and economic development plans envision a significant increase in residential development, with commercial uses concentrated at major intersections and other key nodes. New, residential and mixed-use development is underway in many parts of the

Study Area. Most development projects are replacing low-intensity strip retail with higher-intensity residential or mixed-use development. This additional development will continue to generate new demands on Study Area transportation system, particularly San Pablo Avenue.

- **Development Concentration**: The majority of recently completed, planned, and proposed development in the Corridor is located in El Cerrito (1,470 units in pipeline), Berkeley (1,170 units in pipeline), Emeryville (882 units in pipeline), and Downtown Oakland (4,281 units in pipeline). This reflects the stronger real estate market conditions in these communities, and local land use policies.

TRANSIT SERVICE, RIDERSHIP, AND PERFORMANCE

- **Service**: The Study Area is served by four primary transit providers: BART, AC Transit, WestCAT and Emery Go-Round. AC Transit provides local, Rapid and Transbay services. BART has four stations in close proximity to San Pablo Avenue (El Cerrito Del Norte, El Cerrito Plaza, 19th Street and 12th Street) and two additional stations at the edge of the Study Area (North Berkeley and MacArthur).
- **Ridership**: There are approximately 19,600 weekday boardings on AC Transit buses in the corridor, with over 11,000 of these boardings on San Pablo Avenue itself; with ridership distributed relatively evenly over the course of the day between 7AM and 6PM. The highest ridership stop in the corridor is El Cerrito del Norte BART station with close to 1,500 boardings per day. The four BART stations in the study area have over 40,000 daily boardings.
- **Load**: The highest combined passenger loads on AC Transit buses are found on San Pablo Avenue between University Avenue and just north of the El Cerrito del Norte BART station (~Solano Avenue in Richmond). The most AC Transit routes operate on this segment of San Pablo, which contributes to the additional load and ridership. The drop off south of University Avenue is likely due to passengers transferring to travel to/from UC Berkeley and Downtown Berkeley. Loads do increase approaching downtown Oakland.
- **Bus Stops/Stations**: There are 630 bus stops in the Study Area, 168 of which are located on San Pablo Avenue, and 52 of which are Rapid stops. Local stops generally have only a flag sign with route designation, while Rapid stops have more amenities. However, a large number of these amenities are vandalized, display graffiti and broken glass siding, and/or have rusted shelters/benches/trash cans. Generally, there is a need for higher quality, cleaner, and better-maintained stop/station infrastructure throughout the corridor.
- **Bus Performance**: AC Transit bus performance in the corridor is generally characterized by low speed and reliability. The 72 Rapid, however, does perform better than the AC Transit local routes proving that the Rapid service upgrades do provide benefits for riders.

- **Speed**: During the peak periods, the local AC Transit routes operate at an average of 9 to 12 mph, while the 72 Rapid route operates at an average of 10 to 15 mph. For both services, travel speeds are the lowest in the PM peak northbound direction and slower than autos, which operate at 14-19 mph on average during peak periods. In the peak hours/peak directions, transit is around 30% slower than auto. Transit speed along the corridor is affected by dwell time at stops, the effect of congestion on the ability of transit to pull-in and pull-out from bus stops, signals, and the resulting queues at signals.
- **Variability**: Transit trips has much greater deviation in travel time than auto trips. Geographically, travel speed variability is particularly high in the section of the corridor from the intersection of Gilman Street and the El Cerrito del Norte station in both directions and leading into downtown Oakland.
- **Reliability**: The 72 Rapid is scheduled to operate every 12 minutes throughout the day. However, actual bus arrivals vary significantly. On average throughout the day, approximately one in five buses arrive more than 18 minutes after the prior bus, and reliability worsens in the peak period with nearly one in four buses arriving more than 18 minutes after the prior bus. In general, the bus becomes less reliable over the course of the day and over the course of the route (southbound and northbound). The worst reliability is during the PM peak hours when nearly one third of buses are arrive more than 18 minutes after the prior bus in some locations. Reliability issues are associated with both schedule adherence challenges at the beginning of the route and travel time variability along the route.

- **BART**: BART has high frequencies and speed, providing an attractive option for users in segments of the corridor served by BART stations.

AUTO PERFORMANCE

- Auto performance is generally good for an urban area with generally reliable travel time, high speeds for an urban arterial, and very few intersections below a level of service D.
- **Speed**: Auto travel speed is relatively high for an urban arterial with closely spaced traffic signals. The northern end of San Pablo Avenue north of El Portal Drive experiences the highest travel speeds, with average speeds often greater than 30 mph during the peak periods. Limited segments of the corridor experience travel speeds lower than 15 mph; travel speed tends to be lowest during the PM peak period and along segments that approach major arterials that provide direct access to I-80.
- **Variability**: Traveling by auto along San Pablo Avenue is relatively reliable. In general, speeds do not vary significantly, however, travel time variability does tend to be lower during the PM peak period with several northbound San Pablo Avenue segments experiencing medium to medium-low travel time variability.

- **LOS**: Traffic operation at intersections on the San Pablo Avenue, during both the AM and PM peak hours, operate acceptably (LOS D or better) with the exception of the following three intersections which operate at LOS E during the peak hour:
    - San Pablo Avenue at Ashby Avenue, Berkeley
    - San Pablo Avenue at Road 20/23rd Street, San Pablo
    - San Pablo Avenue at Robert Miller Drive, Richmond

BICYCLE AND PEDESTRIAN CONDITIONS

- **San Pablo Avenue Bicycle Conditions**: The majority of San Pablo Avenue does not have a bicycle facility and is considered very high traffic stress for bicyclists.
- **Bicycle Network**: The corridor is generally characterized by a lack of a continuous and connected bicycle network. While there are a series of higher quality bicycle facilities that run parallel San Pablo Avenue within 1-3 blocks in some segments of the corridor (in particular, Berkeley to Albany), the facilities are not connected to one another to form a continuous facility, and San Pablo Avenue is difficult to cross in most areas along the corridor, serving as a barrier to east-west bicycle network connectivity.
    - **Ohlone Greenway**: The Ohlone Greenway is a well-utilized, low-stress, off-street, multi-use path that provides north-south connectivity parallel to San Pablo Avenue through the middle-northern parts of the Corridor. In places where a facility, such as the Ohlone Greenway, provides a high quality and connected parallel option, many bicyclists and pedestrians are choosing to use that facility rather than San Pablo Avenue.
- **Pedestrian Conditions**: While the majority of San Pablo Avenue is considered a moderate to significant pedestrian emphasis area, the existing pedestrian facilities are very uncomfortable in some areas of the corridor. Pedestrian conditions along San Pablo Avenue in Contra Costa County are generally less comfortable than in Alameda County.
    - **Transit-Pedestrian Connection**: Since the majority of transit users along the Project are pedestrians at some point on their trip, improving pedestrian infrastructure would also enhance access to transit.

SAFETY

- **Collisions**: Bicyclists and pedestrians are over-represented in fatal and severe injury collisions on San Pablo Avenue relative to the proportion of travelers that they comprise. In the last five years of available data (2009-2013), five people were killed on the Project Corridor, four of which were pedestrians and one of which was a bicyclist; no fatalities occurred in auto-only collisions. People walking and biking account for over two-thirds of all fatal and severe injury collisions (pedestrians account for 37%; bicyclists account for 27%).

  - **Speed**: Unsafe speed is a common collision factor between all modes.
  - **Intersections**: Most collisions along San Pablo Avenue occur at or within 100 feet of an intersection. This indicates that projects focusing on safety countermeasures at intersections and intersection approaches may be most impactful, particularly for addressing the needs of the most vulnerable roadway users, bicyclists and pedestrians.
- **High Injury Network**: The high-injury network (HIN) analysis identified the least safe parts of the Study Area across all modes. The HIN is concentrated in the southern half of the corridor, between Ashby and Gilman in Berkeley and between 40th Street and downtown in Oakland. The HIN also includes some individual intersections in Albany, Richmond and San Pablo.
  - **Pedestrian HIN**: Looking just at pedestrian collisions, collisions occur in nearly every segments of the corridor.
  - **Bicyclist HIN**: Looking at bicyclist collisions, beyond the HIN, there is also strong concentration in Albany around Solano Avenue, and in Richmond from MacDonald to Lowell.
- **Geographic Differences**:
  - **South**: The southern portion of the corridor (Oakland, Emeryville) has 30% of all collisions, and around one-third of bicyclist and pedestrian collisions. About half of collisions that have occurred in the southern area involve bicyclists and pedestrians.
  - **Central**: The central portion of the corridor (Berkeley, Albany, El Cerrito) has the highest portion of collisions across all modes with over 60% of the total corridor collisions, half of bicyclist-involved collisions, 57% of pedestrian-involved collisions, and over two-thirds of auto collisions.
  - **North**: The northern portion of the corridor (San Pablo, Richmond) has the lowest overall volume of collisions, with 10% of the total corridor collisions. This area has only 15% of total bicyclist-involved collisions and only 4% of pedestrian-involved collisions.

PARKING AND LOADING

- The project team collected parking data along 8 miles of the corridor.
- **Supply**: 21% of spaces in the corridor are metered (only in Berkeley and Downtown Oakland), the remainder are free with some restrictions: just under 40% of spaces have time restrictions; 4% are loading zones, and less than 1% are reserved for specific users.
- **Parking Utilization**: On-street parking utilization on San Pablo Avenue is low to moderate overall; during every time period, most blocks are less than 60 percent full. Parking occupancy tends to be higher in commercial areas of the corridor and lower in residential areas.
  - **Peak Utilization**: On-street parking occupancy is generally highest during the weekday and Saturday PM peak periods. In a few select

locations parking is more than 90% full in the peak periods. Even where parking occupancy was high, open spaces were always available within three blocks or on the other side of the street.

  - The highest demand was in Downtown Oakland during weekday evenings. Other segments of San Pablo Avenue that showed on-street parking occupancies greater than 90 percent during a peak period were: in the vicinity of El Cerrito Plaza BART Station, University Avenue, Dwight Avenue, Ashby Avenue, Alcatraz Avenue, Stanford Avenue, 40th Street.

- **Truck Loading**: Loading activity is generally highest during the morning peak period (7AM-9AM). Although several on-street parking spaces are designated as loading zones throughout San Pablo Avenue, truck loading generally does not occur in the designated loading spaces. Trucks tend to use the most convenient locations to their destinations, regardless of the designation or on-street parking prohibitions. If curb space is not available, trucks will double park and block a travel lane on San Pablo Avenue. Loading activities tended to cluster around major intersections in commercials areas.

TRIP MAKING AND MODE SHARE

- **Trip Making**: San Pablo Avenue and the BART line form the backbone of a multimodal travel corridor with an estimated 134,000 trips in the morning period; just under one third of total morning period trips in the corridor are on transit currently. Overall trip making is highest in the north end of the corridor; the southern section of the corridor has less travel activity overall.
  - **Role of BART**: Looking at the Study Area as a whole, 31% of all morning period travel activity (nearly 41,000 person trips) are BART-related. This includes about 24,000 person trips to access BART (the remaining 17,000 are person trips arriving on BART). Of these trips over 12,000 (about 50 percent of total person-trips that travel to BART) are coming to BART via walking and biking and about 9,000 (about 38 percent of total person-trips that access BART) by auto. About 2,000 trips (about eight percent of total person-trips that access) are using the bus to access BART.
  - **Trip Patterns**: Very few people are driving the entire length of the corridor. Rather, there is a large number of trips that both start and end within the same city and/or travel to an adjacent city (in particular, a large number of drivers travel within/between Berkeley and Albany or within/between El Cerrito and Richmond). The largest destinations on the corridor are Berkeley/Albany and El Cerrito/Richmond.
- **Types of Auto Trips**: Overall, of the auto trips in the corridor, nearly one-third (32%) are pass-through trips; over two-thirds (68%) are accessing the land uses within the Study Area, and of these, 17% of trips occur wholly within the Study Area. These percentages vary by segment of the corridor.
- **Mode Share**: Mode share varies throughout the corridor.

- **Study Area Mode Share**: Looking at the study area as a whole, mode share is heavily shaped by access to key regional transportation facilities, especially I-80 and BART. Transit use is concentrated in segments that have access to BART stations; southern areas of the corridor with BART access have close to half to three-quarters of trips on transit.
- **San Pablo Avenue Mode Share**: Looking just at San Pablo, bus mode share is highest in the southern part of the corridor; in the northern parts of the corridor, bus mode share is lower with a drop off north of El Cerrito. No comprehensive bike data is available, but bike volumes are highest in the southern parts of the corridor and much lower in the north.

POTENTIAL TRAVEL MARKETS

- **Mode Shift**: Existing auto travel patterns for the San Pablo Avenue Corridor show that there are moderately sized markets for converting existing auto users to other modes if improvements are made to transit, bicycle, and pedestrian facilities. The target market for this mode shift is about 13,000 auto trips that start and end within the corridor. In addition, the Study Area is growing steadily, so demand across all modes is also expected to increase over time.
- **Shift to Other Routes**: There are a significant portion of trips that are pass-through trips that do not originate, end or stop within the corridor. These trips have the potential to shift to other routes without impacting the local economy.

1. INTRODUCTION

San Pablo Avenue is a critical inter-jurisdictional roadway that traverses four cities in Northern Alameda County (Oakland, Emeryville, Berkeley and Albany) and several Western Contra Costa County communities (El Cerrito, Richmond, San Pablo, Pinole, Hercules and unincorporated Contra Costa County). San Pablo Avenue is the heart of a critical travel corridor providing north-south connections throughout the inner East Bay paralleling Interstate-80 (I-80).

San Pablo Avenue carries tens of thousands of people every day connecting multiple communities to job and activity centers. San Pablo Avenue is designated as State Route 123 (SR 123) between MacArthur Boulevard in the City of Emeryville and Cutting Boulevard in the City of El Cerrito. The corridor carries local, rapid and express/Transbay buses and plays a key role as a reliever route for freeway traffic during incidents on I-80. The corridor also includes many high-activity pedestrian areas and is included as a bicycle route in many local jurisdiction plans. Jurisdictions are concentrating growth along the corridor, with several higher-density, mixed-use developments recently completed and numerous others under consideration.

To address the increasing multimodal demands on the San Pablo Avenue Corridor, the Alameda County Transportation Commission (Alameda CTC), in partnership with Contra Costa Transportation Authority (CCTA) and West Contra Costa Transportation Advisory Committee (WCCTAC) is currently leading the development of the San Pablo Avenue Corridor Project (Project) to identify short- and long-term improvements along the corridor, with priority on moving feasible projects towards implementation during the near-term. This report presents the existing transportation conditions of the San Pablo Avenue Corridor. The report describes the existing multimodal transportation infrastructure in addition to land uses and economic development along the corridor and summarizes key findings of past planning efforts. The results contained in this report serve as the basis for identifying Project Concepts in later phases of the Project.

1.1 TERMINOLOGY FOR THIS REPORT

The following terms refer to various geographies used in this report.

- **Study Area** – The half-mile buffer on either side of San Pablo Avenue that provides land use and demographic context for the corridor for the existing conditions analysis.
- **Project Corridor** – The extents of the San Pablo travel corridor between each terminus, inclusive of San Pablo Avenue, key cross street and select parallel streets.
- **San Pablo Avenue** – The roadway and directly adjacent development.

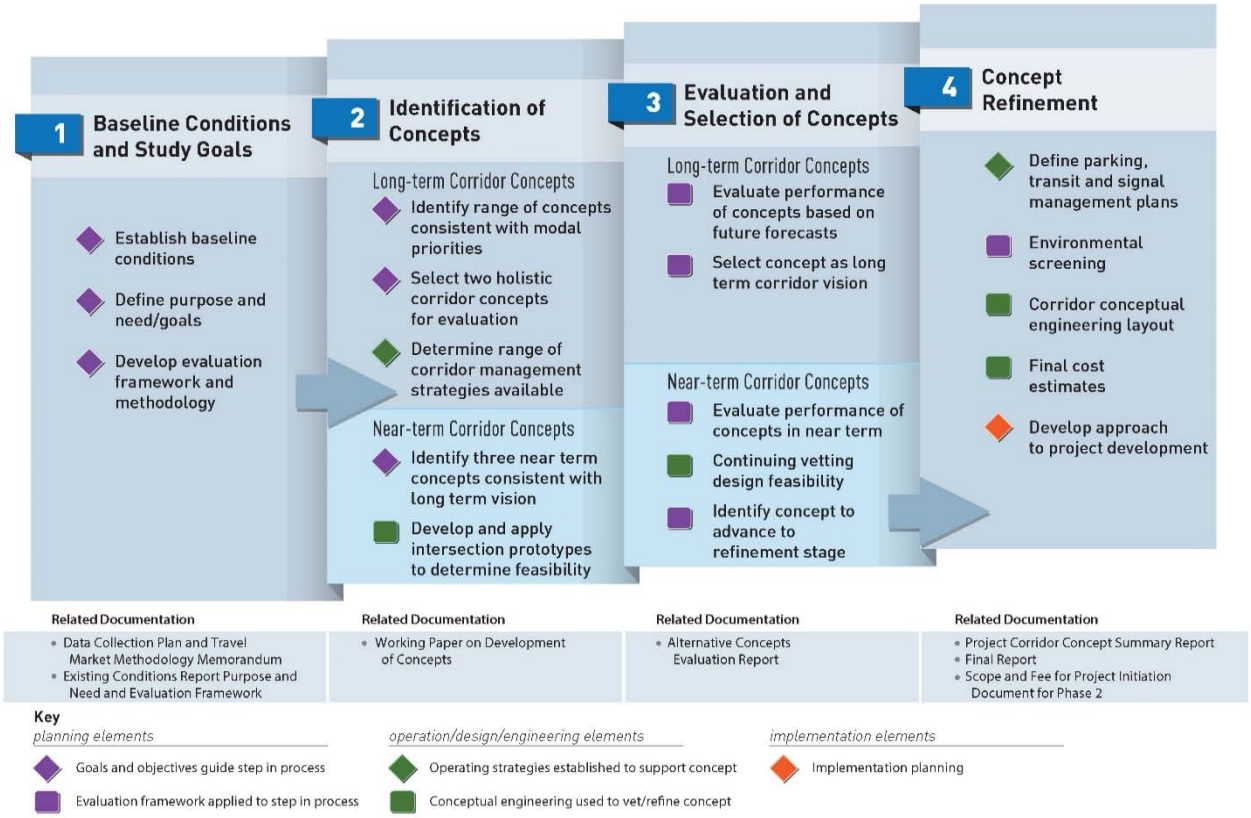
In addition, the following geographic areas are referenced for San Pablo Avenue:

- Northern area – The areas on San Pablo Avenue between I-80 and Hilltop Drive
- Central area – The areas on San Pablo Avenue between I-580 and I-80.
- Southern area – The areas on San Pablo Avenue between southern terminal and I-580.

1.2 PROJECT OVERVIEW

The Project is divided into two stages, (1) Project Definition and Concepts, (2) Project Initiation and Other Project Development Processes. The phases that will be completed as part of Stage 1 are shown on **Figure 1-1** and described below:

Figure 1-1 Stage 1 Technical Process



- **Baseline Conditions & Study Goals** – An evaluation of baseline conditions will inform the development of the purpose, need and goals for the Project. The evaluation framework and analysis methodologies identified as part of this sub-phase are summarized in this Existing Conditions Report. Sub-phase completion is expected by January 2018.
- **Identification of Concepts** – Near-term and long-term corridor improvement concepts that are consistent with the Project purpose and need will be identified as part of this sub-phase. Sub-phase completion is expected by June 2018.
- **Selection & Evaluation of Concepts** – An evaluation using multimodal performance measures will be done of improvement concepts considering

anticipated growth to identify preferred concepts to advance to the refinement stage. Sub-phase completion is expected by September 2018.

- **Refinement of Concepts** – Preferred concepts will be refined by defining specific improvements, treatments and policies and preparing conceptual engineering layouts, cost estimates, and conducting initial environmental screening. This sub-phase will also include developing an approach for the Phase 2 project development. Sub-phase completion is expected by December 2018.

Phase 1 includes stakeholder and community engagement throughout, with extra emphasis at key Project milestones. A separate Stakeholder Engagement Plan will be prepared as part of this Project. The scope of work for Phase 2 will be developed upon completion of Phase 1, initiation of Phase 2 is not expected until 2019. Throughout the Project, as short term improvements are identified that are consistent with the long term purpose and need opportunities will be explored for advancing project delivery concurrent with completion of the Project.

1.3 PROJECT LOCATION

The San Pablo Avenue Project Study Area is located within Alameda County and Contra Costa County. **Figure 1-2** illustrates the Study Area, which extends about 14 miles from 16th Street in the City of Oakland to Hilltop Drive in the City of Richmond. Neighborhoods, including key parallel and cross-streets located within a ½-mile of either side of San Pablo Avenue are considered the Study Area and also included in the evaluation of the San Pablo Avenue Corridor.

1.4 DATA COLLECTION

Prior to conducting the Existing Conditions analysis, a comprehensive Data Collection Plan was prepared, which is summarized in a technical memorandum titled *San Pablo Avenue Corridor Project Data Collection Plan – Final* (Fehr & Peers, September 13, 2017). The Plan provided the framework for data collection including data types and stakeholder requests. Development of the Project relies heavily on readily-available data collected as part of previous studies (e.g. *Alameda Countywide Multimodal Arterial Plan* and the *I-80 SMART Corridor Project*), in addition to data provided by the following agencies:

- Alameda CTC
- Contra Costa Transportation Authority (CCTA)
- West Contra Costa Transportation Advisory Committee (WCCTAC)
- Metropolitan Transportation Commission (MTC)
- California Department of Transportation (Caltrans)
- Alameda-Contra Costa Transit District (AC Transit)
- Bay Area Rapid Transit (BART)
- City of Oakland

San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Freeways
- Water
- Parks/Open Space
- Northern Area
- Central Area
- Southern Area

ALAMEDA County Transportation Commission

Figure 1-2
San Pablo Avenue Corridor

- City of Emeryville
- City of Berkeley
- City of Albany
- City of El Cerrito
- City of Richmond
- City of San Pablo

The data types and years in which the data was collected are described throughout this Existing Conditions Report.

1.5 REPORT ORGANIZATION

The report is organized into chapters:

- **Prior Studies** – Chapter 2 presents an overview of previous planning studies completed by various agencies and includes a summary of goals and capital improvement recommendations for San Pablo Avenue.
- **Transit** – Chapter 3 describes the existing transit network, ridership and operations for the San Pablo Avenue Corridor.
- **Bicycles & Pedestrians** – Chapter 4 describes the bicycle and pedestrian infrastructure, volumes, and the evaluation of user comfort along San Pablo Avenue.
- **Automobiles & ITS** – Chapter 5 presents a summary of automobile volumes and traffic operations along the corridor, including existing peak hour intersection Level of Service (LOS) and average peak period travel speed. An evaluation of existing intelligent transportation systems (ITS) infrastructure is also provided.
- **Parking** – Chapter 6 presents a comprehensive evaluation of on-street parking supply, in addition to typical weekday and weekend peak period parking occupancy along eight miles of San Pablo Avenue.
- **Goods Movement** – Chapter 7 describes the goods movement network and presents an evaluation of goods movement delivery operations for businesses along San Pablo Avenue.
- **Safety** – Chapter 8 presents an evaluation of multimodal safety along the San Pablo Avenue Corridor based on the collision analysis conducted for the Project.
- **Travel Market Assessment** – Chapter 9 presents the travel market assessment conducted for the Project, which includes an evaluation of origin-destination and travel patterns for the Study Area.
- **Land Use Context, Urban Design, Demographics, and Economic Development** – Chapter 10 presents a review of land use context and urban design along San Pablo Avenue. A summary of existing housing, jobs and demographics for the Study Area is also provided, in addition to an evaluation of economic development within the Study Area.

2. PRIOR STUDIES AND PLANS

This chapter provides a review of prior studies and adopted plans at the county and regional level (see 2.1) as well as the jurisdictional level (see 2.2). The intent of the review is to provide an overview of how the content, goals, and key San Pablo Avenue related outcomes shape the Project. Discussion of Priority Development Area designations along the corridor is included in Chapter 10.

2.1 AGENCY-LED STUDIES AND PLANS

The following agency-led documents were reviewed:

- Alameda Countywide Transportation Plan (Alameda CTC, 2016)*
- Alameda Multimodal Arterials Plan (Alameda CTC, 2016)
- Alameda Countywide Transit Plan (Alameda CTC, 2016)*
- Alameda County Goods Movement Plan (Alameda CTC, 2016)*
- Alameda Countywide Bicycle Plan (Alameda CTC, 2012)*
- Alameda Countywide Pedestrian Plan (Alameda CTC, 2012)*
- AC Transit Major Corridors Study (AC Transit, 2016)
- AC Transit Transbay Comprehensive Operational Analysis (AC Transit, 2017/ongoing)
- Contra Costa County Countywide Comprehensive Transportation Plan Update: West County Action Plan (Contra Costa Transportation Authority, 2017)
- West County High-Capacity Transit Study (West Contra Costa Transportation Advisory Committee, 2017)
- I-80 Smart Corridor – Traffic Operations Analysis Report (Caltrans, 2011)
- Metropolitan Transportation Commission's (MTC) Core Capacity Transit Study (MTC, 2017)
- Caltrans Smart Mobility Framework (Caltrans, 2010)
- Caltrans District 4 Bicycle Plan (2017/ongoing)

* Refer to **Appendix A** for a description of the countywide plans marked with an asterisk.

Key outcomes and list of recommended capital improvements identified in each plan and study are summarized in **Table 2-1**.

Please note that most of the document and goal descriptions below as well as other information are composed of text directly taken from the reviewed documents without providing quotation marks or specific references.

Table 2.1: Plan and Study Outcomes and Recommended Projects or Improvements with Relevance for the San Pablo Avenue Corridor

Alameda Countywide Multimodal Arterial Plan (2016)

Network	Improvement Type/Designation	Limits	Jurisdictions	Comments
Transit Network	Dedicated Transit Lanes	Northern County line to 20th Street in Oakland	Albany, Berkeley, Emeryville, Oakland, Caltrans	Recommendations are consistent with the Major Corridors Study
Pedestrian Network	Crosswalk Enhancements	Northern County line to 20th Street in Oakland	Albany, Berkeley, Emeryville, Oakland, Caltrans	
	Pedestrian Scale Lighting	Northern County line to 20th Street in Oakland	Albany, Berkeley, Emeryville, Oakland, Caltrans	
	Curb Extensions	-Northern County line to Dartmouth Street in Albany -67th Street to 32nd Street in Emeryville and Oakland	Albany, Emeryville, Oakland, Caltrans	Curb extension proposed along segments that would not require removal of on-street parking to accommodate dedicated transit lanes AND Class 4 protected bicycle lanes.
Bicycle Network	Class 4 Protected Bicycle Lanes	-Marin Avenue in Albany to 67th Street (Berkeley/Oakland border) -32nd Street to 20th Street in Oakland	Albany, Berkeley, Oakland, Caltrans	Providing dedicated transit lanes and Class 4 protected bicycle lanes will require removal of on-street parking. Emeryville opted against Class 4 protected bicycle lanes, staff prefer to maintain/implement parallel bikeways. Albany opted against Class 4 protected bicycle lanes north of Marin Avenue, staff prefer to maintain parallel bikeways.
Auto Network	Highest Level of ITS Infrastructure	Downtown Oakland to northern County line (Albany/El Cerrito border)	Albany, Berkeley, Emeryville, Oakland, Caltrans	Infrastructure improvements assume: Traffic Management Center, adaptive signal timing controls with transit signal priority, CCTV cameras, changeable message signs, connected/autonomous vehicle communication capabilities.
Goods Movement	None	N/A	N/A	San Pablo Avenue is assumed as a Tier 2 Goods Movement route between MacArthur Avenue and Northern County line in the Alameda Countywide Goods Movement Plan.

Alameda Countywide Transit Plan (2016)

Network	Improvement Type/Designation	Limits	Jurisdictions	Comments
Transit Network	Regional Express Tier Draft Recommendations	R7 Emeryville – Berkeley – San Rafael	Albany, Berkeley, Emeryville, Oakland, Caltrans	Approximate alignment of service shown in plan could be located on San Pablo Avenue Recommended Capital Improvements inlcude: - Portions of the route operating on dedicated bus lanes - Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control
Transit Network	Urban Rapid Tier Draft Recommendations	U2 Richmond Parkway Transit Center – Jack London Square Amtrak: From Richmond to downtown Oakland via San Pablo Avenue (generally conforms with AC Route 72R)	Albany, Berkeley, Emeryville, Oakland, Caltrans	Recommended Capital Improvements inlcude: - Bus Bulbs - Portions of the route operating on dedicated or semiexclusive lanes - Other selected transit priority treatments including transit signal priority (TSP) and adaptive signal control

Alameda County Goods Movement Plan (2016)

Network	Improvement Type/Designation	Limits	Jurisdictions	Comments
Goods Movement	Tier 2 Truck Route (Tier 2 truck routes refer to other state highways and designated arterials that provide intracounty and intercity connectivity and last-mile connection)	Downtown Oakland to northern County line (Albany/El Cerrito border)	Albany, Berkeley, Emeryville, Oakland, Caltrans	- No specific mention is made of San Pablo Avenue with regard to corridor-specifc issues or potential improvements

Almeda Countywide Bicycle Plan (2012)

Network	Improvement Type/Designation	Limits	Jurisdictions	Comments
				General Note: San Pablo identified by local jurisdictions as major barrier
Bicycle Network	San Pablo Segment included in Vison Network	Solano Avenue to Marin Avenue	Albany	- no specific improvements or projects described
Bicycle Network	San Pablo Segment included in Vison Network	32nd Street to Thomas L. Berkeley Way	Oakland	- no specific improvements or projects described

Almeda Countywide Pedestrian Plan (2012)

Network	Improvement Type/Designation	Limits	Jurisdictions	Comments
Pedestrian Network	San Pablo is included in Vison Network based on criteria: Access to Transit, Access to PDAs, Access to Communities of Concern, access to CBD, and Access to Activity Centers	Downtown Oakland to northern County line (Albany/El Cerrito border)	Albany, Berkeley, Emeryville, Oakland, Caltrans	- no specific improvements or projects described However, most of San Pablo falls under the plans definition of Priority Network (not mapped in plan) based on based on criteria: Access to Transit, Access to PDAs, Access to Communities of Concern, access to CBD.

AC Transit Major Corridors Study (2016)

Major Corridor Study's final recommendation regarding San Pablo Avenue/Macdonald Avenue Corridor: Short-Term (by 2020) Rapid Bus Upgrades and Long-Term (by 2040) BRT.

Conclusion: A BRT investment in the San Pablo Avenue/Macdonald Avenue corridor would yield significant improvements in ridership, travel speed, and ridership productivity, and result in more efficient service. The potential northern extension would provide an opportunity for passengers to transfer to/from WestCAT.

County- and regional-level planning efforts have also identified San Pablo Avenue as a key corridor with the need and potential for transit investments. A BRT strategy is being explored by the West Contra Costa Transportation Advisory Committee's High-Capacity Transit Study and is included as an investment recommendation in Contra Costa Transportation Authority's Comprehensive Transportation Plan Update. Alameda CTC is planning to take a lead role in multi-modal planning efforts for this corridor. In addition, BRT on San Pablo Avenue is currently being evaluated in MTC's Plan Bay Area update.

By 2020, the San Pablo Avenue/Macdonald Avenue corridor, which now has Rapid Bus, could be improved with Rapid Bus upgrades.

Network	Improvement Type/Designation	Limits	Jurisdictions	Comments
Transit Network	Dedicated Transit Lanes and extend Route 72/72R north to Richmond Parkway Transit Center.	Richmond Parkway Transit Center to 20th Street in Oakland	Albany, Berkeley, Emeryville, Oakland, Caltrans, El Cerrito, Richmond, San Pablo, Contra Costa County	AC Transit assumes that all dedicated transit lane/BRT projects will include complementary pedestrian acces improvements (e.g. streetscape enhancments, new or expanded sidewalks, crosswalk enhancements, lighting improvements, etc.)

AC Transit Transbay Comprehensive Operational Analysis (2017/Ongoing)

Initial Outcomes from Existing Conditions Phase with relevance for San Pablo Avenue

Line G (operating on San Pablo Avenue) is the only line in the region to have nearly a third more riders in the morning than the afternoon.

Line Z (operating partially on San Pablo) is one of the least productive lines across all Transbay lines but experiences some of the highest local ridership at 6%

Contra Costa County Countywide Transportation Plan Volume 1 (2017)

Network	Improvement Type/Designation	Limits	Jurisdictions	Comments
Auto Network	San Pablo Avenue is a designated Routes of Regional Significance for Contra Costa County.	I-80/Pomona Street in Crockett to Alameda Co. limit	Richmond/San Pablo/El Cerrito	The Authority maintains a "master" project list that includes all projects – completed, under construction, and proposed. Called the Comprehensive Transportation Project List, or CTPL, this financially-unconstrained project list is used to track all potential projects and their funding status.

Contra Costa County Countywide Transportation Plan Volume 2 (2017)

Projects listed in the Plan that include physical, operational, or transit service related improvements on San Pablo Avenue in the Study Area

Table A-3: Performance Assessment of Large Projects (≥ $25 Million), Using MTC's Performance Targets from MTC 2013 RTP

Project ID: 4068; Project Name: AC Transit Purchase of Expansion Buses; Project Description: Purchase 12 buses, 8 to be used to improve Express Bus service on I-80 and RAPID service on San Pablo Ave. and 4 for feeder service. Project Spansor: AC Transit; Total Project Cost: $118,000,000

Project ID: 4667; Project Name: San Pablo Avenue Phase 3 Transit Enhancements - High Capacity Bus; Project Description: Upgrade the existing local and Rapid Bus service to a full Bus Rapid Transit (BRT) linking El Cerrito del Norte BART Station with central El Cerrito near Carlson Blvd. Primary Project Sponsor: AC Transit; Total Project Cost: $46,750,000

The following represents select projects from the 10-year and 20-year priorities lists for the 2017 CTP. Projects listed below were selected based on their assumed relevance for the San Pablo Corridor project.

10-YEAR PROJECT LIST: This list is comprised of projects included in the adopted 2013 Plan Bay Area, with adjustments to reflect 2017 escalated project costs. The total cost for this initial list equals $3.672 billion. The cost estimate in Year of Expenditure (YOE) dollars is $4.223 billion. Projects that have recently been complete are marked accordingly.

Contra Costa County TLC/Streetscape Projects; Fund and implement Transportation for Livable Communities (TLC) and streetscape projects in Contra Costa County.
Sponsor: CCTA; COST: TLC $117.4 M

San Pablo Avenue Phase 1 Transit Enhancements - Rapid Bus Upgrades Construct enhancements to San Pablo Rapid Bus Service, including real-time info, queue jump lanes, buses and on-board equipment, and passenger amenities. Sponsor: AC Transit Transit; Cost: $21.3M

20-YEAR PROJECT LIST: This list was developed through a comprehensive public outreach effort as described in Chapter 1 of Volume 1. It also carries forward the goals and strategies of the RTPC Action Plans and the CTP. The Authority has worked with its local and regional partners to develop project priorities that are feasibility, cost effectiveness, and offer systemwide benefits. This list reflects the Authority's priority projects should additional funding became available from local, regional, state, or federal sources. The total estimated costs of all of the projects is $6.447 billion. This corresponds with funding that could be generated by a new sales tax measure, and assumes a leverage factor of 2:1. The cost estimate in YOE dollars is $8.458 billion.

- Upgrade infrastructure in PDA's to prepare for targeted growth.Ready priority development areas for future growth by improving pedestrian and bicycle infrastructure to provide connectivity and ADA compliance. Sponsor: County; Bike/Ped; COST: $0.8 M

- Ohlone Greenway Improvements Implement crossing, wayfinding, signing, lighting, safety and security, and landscaping improvements along Ohlone Greenway; Sponsor: El Cerrito; Bike/Ped; COST: $2.9 M

- Bike/Ped improvements on San Pablo Avenue in West County Construct bicycle- and pedestrian-friendly improvements along San Pablo Avenue from El Cerrito to Crockett to support transit-oriented development. Sponsor: WCCTAC; Cost: Bike/Ped $6.7 M

- El Cerrito Active Transportation Plan Improvements Active Transportation Plan Improvements (Bicycle & Ped) thru 2035; Sponsor: El Cerrito; Bike/Ped; COST: $34.7 M

- San Pablo Avenue Complete Streets, Rivers to Lowell Construct complete streets improvements from River Street in San Pablo to Lowell Avenue in Richmond. Includes bike, pedestrian and transit improvements. Sponsor: City of San Pablo; Freeway/Roadway; Cost: $13.1 M

- San Pablo Avenue Complete Streets Construct bicycle and pedestrian improvements along San Pablo Avenue between Rivers Street and Hilltop Drive; Sponsor: Cities of San Pablo/Richmond; Freeway/Roadway; Cost $7.1 M

- San Pablo Avenue Complete Street, Rivers Street to Lowell Avenue Construct bicycle/pedestrian and transit improvements; Sponsor: WCCTAC/San Pablo; Freeway/Roadway; Cost: $11.4 M

- San Pablo Avenue Cycle Track, Bicycle and Pedestrian Improvements Implement Complete Streets improvements including directional Cycle Track and other bicycle, pedestrian and transit improvements in El Cerrito; Sponsor: City of El Cerrito; Freeway/Roadway; Cost: $7.8 M

- San Pablo Avenue Intersection Realignment at 23rd Street and Road 20; Sponsor: City of San Pablo; Freeway/Roadway; Cost: $4.9 M

- Replace San Pablo Avenue Bridge over San Pablo Creek Construct new San Pablo Creek bridge and replace existing bridge on San Pablo Avenue in San Pablo; Sponsor: San Pablo; Freeway/Roadway; COST: $8.8 M

- Del Norte Area Transit-Oriented Development (TOD) Transportation Improvements - Phase 2 Construction of multimodal and parking improvements within half mile of El Cerrito del Norte station; Sponsor: El Cerrito; Transit; $22.4 M

- West County High Capacity Transit Investment Study Implementation; Implement the recommended improvements from the West County High Capacity Transit Investment Study; Sponsor: WCCTAC; Transit; COST: $13.6 M (Phase 1) and $366.1 (Phase 2)

- Bus shelters and transit stop improvements Design and construct bus shelters and other transit stop safety and comfort improvements, including lighting and landscaping improvements; Sponsor: Richmond; Transit; COST $3.7 M

West Contra Costa High-Capacity Study (2017)

The I-80 and the San Pablo Avenue corridors showed the greatest potential for transit investment over time, as did improved service in Richmond, El Cerrito, and San Pablo to capture the growing density of development.

ALT 2: San Pablo Avenue / Macdonald Avenue BRT
San Pablo Avenue/Macdonald Avenue BRT from El Cerrito del Norte BART to Richmond Parkway Transit Center, serving Contra Costa College and Hilltop Mall on the San Pablo alignment; to Tewksbury Turnaround and serving the Richmond BART/Capitol Corridor station on Macdonald Avenue. Possible extensions of San Pablo BRT to Hercules Transit Center and to the Hercules Intermodal Transit Center (at Bayfront Boulevard).

The BRT improvements on San Pablo and Macdonald Avenues approximate the existing 72R Rapid Bus that run along these two streets. The proposed project would introduce BRT service from downtown Oakland to the Richmond Parkway Transit Center and extend Rapid Bus from the Richmond Parkway Transit Center north to the Hercules Transit Center.

In the short-term, Rapid Bus Improvements could be extended to Richmond Parkway with service to Contra Costa College and Hilltop Mall and transit priority treatments introduced along the corridor. Extending Rapid Bus treatments north to the Hercules Transit Center and introducing bus-only lanes on San Pablo Avenue from El Cerrito del Norte north to 23rd Street and on Macdonald Avenue from San Pablo west to 23rd Street could occur in the medium-term. Long-term improvements could include extending bus-only lanes on San Pablo Avenue to Richmond Parkway and Rapid Bus service to the Hercules RITC. Park-andride lot expansion and development of an Express Bus/BRT Transit Center at I-80/ Macdonald Avenue could also occur in the medium to long-term. BRT improvements are flexible, allowing local jurisdictions and transit agencies to implement a program that is the best fit for the proposed transit corridor and to phase them in over time as demand grows and funding becomes available.

ALT 3: 23rd Street BRT
23rd Street BRT from Richmond Ferry Terminal to Richmond BART/Capitol Corridor station, then continuing to Contra Costa College, with possible extension along San Pablo Avenue to Hilltop Mall and Hercules.

The 23rd Street BRT is a north-south running alignment that serves the planned Richmond Ford Point Ferry Terminal and the Richmond Field Station in the south, runs through downtown Richmond on 23rd Street, continuing through the City of San Pablo's business district, where it transitions to San Pablo Avenue. Continuing north on San Pablo Avenue, the BRT would serve Contra Costa College, Hilltop Mall, and the Hercules Transit Center. In the short-term, transit priority treatments could be implemented as Rapid Bus service along the corridor and a BRT station provided at the Ford Point Ferry Terminal. Medium-term improvements might include bus-only lanes on 23rd Street from Macdonald Avenue to Rheem Avenue, BRT stations and new vehicles, and expansion of parkand-ride facilities at Richmond Parkway and Hercules Transit Centers. In the long-term, bus-only lanes could be implemented on San Pablo Avenue if street width allows) and San Pablo Avenue north to Hilltop Mall. Rapid Bus service could also be extended to the RITC in Hercules.

BRT: The transit market assessment showed the importance of providing transit options for the trips that are made within West County every day. The ridership projections indicate that BRT can work within West County and WCCTAC's participation in the upcoming San Pablo Avenue Multimodal Corridor Study will advance the project development of the San Pablo BRT alternative. The success of the Rapid Bus service on San Pablo Avenue provides an early indication of the potential improvements that can be realized with BRT investments, but the real advantages for transit priority will come only with priority being given to moving people rather than cars along the BRT corridors.

Network	Improvement Type/Designation	Limits	Jurisdictions	Comments
Transit Network	BRT and extend Route 72/72R north to Hercules.	Hercules to southern County line (El Cerrito/Albany border).	Caltrans, El Cerrito, Richmond, San Pablo, Hercules, Contra Costa County	The High-Capacity Transit Study is currently considering the following alternatives: -Alternative 1: Express Bus on I-80 -Alternative 2: San Pablo Ave/MacDonald Ave BRT (assumes BRT on San Pablo Ave between Richmond Parkway Transit Center and Southern County line, and mixed-flow operations north of Richmond Parkway Transit Center to Hercules) -Alternative 3: 23rd Street BRT (assumes San Pablo Ave with mixed-flow lane operations) -Alternative 4: UPRR Commuter Rail -Alternative 6: BART Extension from Richmond

I-80 SMART Corridor Project (2011)				
Improvements along San Pablo Avenue Corridor and Other Arterials: The I-80 ICM Project includes upgraded traffic signal hardware, software and interconnect enhancements, and installation of arterial management components such as closed-circuit television (CCTV) cameras, trailblazer signs, CMS and communication and detection equipment on San Pablo Avenue from MacArthur Boulevard in Oakland to Cummings Skyway in Contra Costa County and local arterials. Other improvements include: extended transit signal priority along San Pablo Avenue Corridor and crossing arterials; extended emergency vehicle preemption; and installation of pedestrian push buttons and countdown signal heads at traffic signals in Pinole, minor traffic signal modification in El Cerrito, intersection striping improvements for transit near El Cerrito del Norte BART Station, and installation of two new traffic signals in Richmond. The analysis conducted for the Operations Analysis report is a snapshot of the potential ICM strategy benefits using a micro-simulation tool to evaluate traffic operations. Ultimately, a real-life implementation should be the real test for the measures evaluated in this study. However, based on the simulation tool, the analysis indicates that the proposed combination of ICM strategies (Ramp Metering, VASL, and Lane Management) is projected to provide significant operational and safety benefits under both recurring and non-recurring conditions. Specific findings from the analysis indicate that under recurring conditions the refined I-80 ICM project strategy: - will not result in the diversion of trips from the freeway to parallel routes such as San Pablo Avenue, but can keep traffic on the freeway by discouraging drivers from hopping off the freeway and back on. - will have an insignificant or minor impact to the arterial network as a whole and San Pablo Avenue, in particular, with respect to hours of delay and average speeds. - will not have a significant negative impact on intersection LOS Despite the benefits provided by the I-80 ICM Project, significant congestion affecting the freeway, ramps and arterials is projected to remain.				
Network	**Improvement Type/Designation**	**Limits**	**Jurisdictions**	**Comments**
Auto Network	ITS infrastructure (integrated electronic signs, interchangeable message signs ramp meters, real-time info, etc.)	Carquinez Bridge to Bay Bridge	Caltrans	The ITS infrastructure will be integrated with and managed from the Traffic Management Center at Caltrans District 4 office.

Caltrans Bike Plan (2017/Ongoing)				
Proposed projects listed below are from Draft District 4 Bike Plan Proposed Projects (and based on survey results received as part of the Community Outreach for the plan)				
Network	**Improvement Type/Designation**	**Limits**	**Jurisdictions**	**Comments**
Bicycle Network	Corridor Improvement- Class IV	Monroe St - Haskell St (Albany/Berkeley)	Caltrans	From Berkeley Bike Plan - City of Berkeley limits only
Bicycle Network	Intersection Improvement at controlled intersection	Russell Street - Haskell Street (Berkeley)	Caltrans	Large survey demand for crossing along and across San Pablo.
Bicycle Network	Intersection Improvement at controlled intersection	Bancroft Way - Dwight Way (Berkeley)	Caltrans	Channing Way is currently unsignalized crossing of bike boulevard. Proposed in Berkeley Bike Plan.
Bicycle Network	Intersection Improvement at controlled intersection	Pardee St - Haskell St (Berkeley)	Caltrans	Berkeley Bike Plan proposes two-way cycletrack connector between two legs of Heinz and Oregon St.
Bicycle Network	Intersection Improvement at controlled intersection	Harrison St - Camelia St (Berkeley)	Caltrans	Consider protected intersection improvements or lane continuation for Gilman Street.
Bicycle Network	Intersection Improvement at uncontrolled intersection	Harrison St - Camelia St (Berkeley)	Caltrans	Berkeley Bike Plan recommends PHB for proposed bike blvd on Carmelia
Bicycle Network	Intersection Improvement at controlled intersection	Buchanan St - Monroe St (Albany)	Caltrans	Continue bike lanes through intersection for Marin Avenue consider other treatments
Bicycle Network	Intersection Improvement at controlled intersection	Camelia St - Cedar St (Berkeley)	Caltrans	There is a proposal to study putting a cycletrack on Cedars/Hopkins through a Complete Street Corridor Study. Interim treatment planned.
Bicycle Network	Intersection Improvement at uncontrolled intersection	Dwight Way - Pardee St (Berkeley)	Caltrans	Proposed PHB in Berkeley Bike Plan.
Bicycle Network	Intersection Improvement at controlled intersection	Delaware St - Addison St (Berkeley)	Caltrans	Two-way cycle track connector on San Pablo Blvd to connect two legs of bike blvd
Bicycle Network	Intersection Improvement at uncontrolled intersection	Cedar St - Delaware St (Berkeley)	Caltrans	Berkeley Bike Plan suggests PHB
Bicycle Network	Intersection Improvement at controlled intersection	Addison St - Bancroft Way (Berkeley)	Caltrans	Improve crossing of bicyclists on Allston Way bike boulevard
Bicycle Network	Intersection Improvement at controlled intersection	Haskell St - Alcatraz (Berkeley/Oakland)	Caltrans	Provide improved crossing for 65th across San Pablo Ave.
Bicycle Network	Intersection Improvement at controlled intersection	Aileen St - Oak Creek Way (Oakland/Emeryville)	Caltrans	Provide improved crossing and left turn for 53rd across San Pablo
Bicycle Network	Intersection Improvement at controlled intersection	43rd St - 39th St (Emeryville)	Caltrans	Continue to provide improvements to intersection of 40th and San Pablo with enhanced markings, bike boxes, etc.

2.1.1 ALAMEDA COUNTYWIDE MULTIMODAL ARTERIAL PLAN (2016)

Description: The Alameda Countywide Multimodal Plan (MAP) was prepared to better understand the existing and future role and function of the countywide arterial system that provide a framework for designing, prioritizing and implementing improvements in the context of the surrounding land use to address the needs of all modes on the county's arterial roadways. The plan provides a basis for the integrated management of major arterial corridors and identified a priority list of short- and long-term improvements and strategies.

Key Goal(s): The MAP states the following overarching goals:

1. Multimodal: Based on local context and modal priorities, the arterial network will provide high quality, well-maintained and reliable facilities.
2. Accessible and Equitable: The arterial network will provide access for people of all ages, abilities, incomes and geographies.
3. Connected across the County and Region: Using typologies that support local land use, the arterial network will provide connections for all modes within the county and across the County's and Region's network of streets, highways, and transit, bicycle and pedestrian routes.
4. Efficient Use of Resources: Investment in the arterial network will make efficient and effective use of resources.
5. Safe, Healthy and Vibrant: The arterial network will be designed, built and managed to reduce the incidence and severity of collisions, promote public health and help create vibrant local communities.

Outcomes relevant to the Project: see summary in Table 2-1. In addition to recommending capital improvements along San Pablo Avenue, the MAP also identified modal priorities ranked one through five along each segment within Alameda County based on stakeholder input. The intent for identifying modal priorities on each segment was to acknowledge that right-of-way on most arterial segments is limited and many are not able to accommodate improvements for all modes. Therefore, recommended improvements were generally focused on identifying improvements for the top two priority modes. The top three modal priorities along San Pablo Avenue within Alameda County are summarized in **Table 2-2**.

TABLE 2-2: SAN PABLO AVENUE MODAL PRIORITIES AND RECOMMENDED IMPROVEMENTS (ALAMEDA COUNTY)

Jurisdiction	Segment Limits	Modal Priority (In Order)	Improvements				
			Transit	ITS	Bike	Ped	Truck
Oakland	16th St to 20th St	Pedestrian Bicycle Transit Auto Truck	None	High Level	None	None	None
	20th St to 33rd St	Transit Pedestrian Bicycle Auto Truck	Dedicated Transit Lanes	High Level	Class 4 Protected Bike Lanes	Crosswalk Improvements, Pedestrian Scale Lighting	None
	33rd St to 36th St	Transit Pedestrian Auto Bicycle Truck	Dedicated Transit Lanes	High Level	None	Crosswalk Improvements, Pedestrian Scale Lighting, Curb Extensions	None
	53rd St to Haskell St	Transit Auto Pedestrian Truck Bicycle	Dedicated Transit Lanes	High Level	None	Crosswalk Improvements, Pedestrian Scale Lighting, Curb Extensions	None
Emeryville	36th St to 53rd St	Transit Auto Pedestrian Truck Bicycle	Dedicated Transit Lanes	High Level	None	Crosswalk Improvements, Pedestrian Scale Lighting, Curb Extensions	None
Berkeley	53rd St to Harrison St	Transit Truck Pedestrian Auto Bicycle	Dedicated Transit Lanes	High Level	Class 4 Protected Bike Lanes	Crosswalk Improvements, Pedestrian Scale Lighting	None
Albany	Harrison St	Auto Transit Pedestrian Bicycle Truck	Dedicated Transit Lanes	High Level	None	Crosswalk Improvements, Pedestrian Scale Lighting, Curb Extensions	None

Source: *Alameda Countywide Multimodal Arterial Plan* (Alameda CTC, 2016).

2.1.2 AC TRANSIT DRAFT MAJOR CORRIDORS STUDY (2016)

Description: The Major Corridors Study is being carried out to refresh the capital investment recommendations in AC Transit's Strategic Vision. The study focuses on developing and analyzing capital improvements for AC Transit's key corridors and recommends short- and long-term investment strategies to help shape AC Transit's capital investment program for the next two decades. By focusing on those corridors and routes with the highest ridership, the study is identifying the best opportunities to benefit the largest number of customers and to attract new riders by 2040. San Pablo Avenue is identified as a major transit corridor through Alameda County and Contra Costa County in the study.

Like its predecessor document, the Strategic Vision, the Major Corridors Study lays out a phased approach and a menu of options to improve bus service on AC Transit's highest ridership corridors. It aims to increase transit variability and service quality and helps to inform the District's capital improvements for the next 25 years to meet the region's anticipated growth and need for high quality, high-capacity transit.

Outcomes relevant to the Project: see summary in Table 2-1.

2.1.3 AC TRANSIT TRANSBAY COMPREHENSIVE OPERATIONAL ANALYSIS (2017)

Description: AC Transit has embarked on a Comprehensive Operations Analysis study for its Transbay Bay Bridge services. The study, publicly referred to as "Transbay Tomorrow," kicked off in February 2017 and originated from the initial findings of the MTC Core Capacity Transit Study. The study will ultimately develop recommendations for service, fares, and capital projects.

AC Transit has completed its existing conditions analysis and two survey efforts, an on-board survey and an operator survey, both of which collected data on different types of changes and improvements.

The three phases of the ongoing project are:

1. Existing Conditions (complete)
2. Cost-Neutral Plan & Fare Policy (ongoing)
3. Expansion Plan (2018)

The study is expected to be completed in 2018.

Outcomes relevant to the Project: see summary in Table 2-1.

2.1.4 WEST COUNTY HIGH-CAPACITY TRANSIT STUDY - FINAL REPORT (2017)

Description: The High-Capacity Transit Study was initiated by West Contra Costa Transportation Advisory Committee (WCCTAC) to evaluate multimodal high-capacity transit (HCT) options that would enhance transit connectivity and accessibility in West County and to plan for future growth. The study identifies and evaluates the feasibility and effectiveness of HCT options in West County. The Study Area includes I-80, I-580, and State Route 4 (SR 4) as well as major surface streets, including San Pablo Avenue and Richmond Parkway.

Outcomes relevant to the Project: The Study concludes that based on the conducted assessment of the propensity for transit – performed using a Transit Suitability Index (TSI), under current conditions, the greatest potential for transit exists in the cities of El Cerrito, Richmond, and San Pablo in the southern part of West County. Over time, the potential for transit ridership will grow as the areas with medium to high transit potential expand within the El Cerrito, Richmond, and San Pablo areas. The I-80 and the San Pablo Avenue corridors showed the greatest potential for transit investment over time, as did improved service in Richmond, El Cerrito, and San Pablo to capture the growing density of development.

For these corridors, the Study describes Express Bus and BRT as alternatives that can be implemented relatively quickly and are scalable. Express Bus is described as having a high level of public support. Alternative #2 (BRT on San Pablo Avenue between 23rd Street and the Richmond Parkway Transit Center) is described as including BRT improvements on San Pablo that would approximate the existing 72R Rapid and provide Bus BRT service from downtown Oakland to the Richmond Parkway Transit Center. In the short-term, Rapid Bus Improvements could be extended to Richmond Parkway with service to Contra Costa College and Hilltop Mall and transit priority treatments introduced along the corridor.

The Study concludes that the BRT on San Pablo Avenue alternative ranks high in service to currently under-served transit markets, service to regional transit centers and priority development areas (PDAs), annualized cost per rider, and public stakeholder support.

The time horizon and investment levels for the implementation of successive improvements leading to the BRT alternative are described as follows:

Short Term Improvements ($3m): Transit priority improvements (signal priority, queue jumps); Extended Rapid Bus improvements to Richmond Parkway.

Medium-Term Improvements ($180m): Extended Rapid Bus to Hercules Transit Center; Expanded parking at Richmond Parkway and Hercules Transit Centers; San Pablo Avenue bus-only lanes – El Cerrito Del Norte to 23rd Street; Macdonald bus-ony

lanes – San Pablo Avenue to 23rd Street *(NOTE: some of these improvements are located outside of the San Pablo Corridor project area).*

Long-Term Improvements ($60m): San Pablo Avenue bus-only lanes – 23rd Street to Richmond Parkway; Express Bus-BRT transit center at Macdonald Avenue and I-80; extended Rapid Bus service to RITC *(NOTE: some of these improvements are located outside of the San Pablo Corridor project area).*

Also see summary in Table 2-1.

2.1.5 CONTRA COSTA COUNTY COUNTYWIDE COMPREHENSIVE TRANSPORTATION PLAN UPDATE: WEST COUNTY ACTION PLAN (2017)

Description: The Contra Costa Countywide Transportation Plan (CTP) is the blueprint for Contra Costa's transportation system over the coming decades. This long-range vision for transportation identifies the projects, programs, and policies that the Authority Board hopes to pursue. The CTP identifies goals for bringing together all modes of travel, networks and operators, to meet the diverse needs of Contra Costa County and to support Plan Bay Area. The CTP incorporates recommended improvements identified in the *West County Action Plan for Routes of Regional Significance* (WCCTAC, CCTA, January 2014).

Other noteworthy objectives mentioned in the document include the following:

- Street and Roadway Improvements: Improve the highway and arterial system to influence the location and nature of anticipated growth in accordance with the General Plans of local jurisdictions and consistent with the Authority's adopted Countywide Transportation Plan.
- Complete Streets: Require local jurisdictions to incorporate policies and standards for "complete streets" that support transit, bicycle and pedestrian access in new developments, infill development areas ("Priority Development Areas"), and transit priority areas.

Outcomes relevant to the Project: see summary in Table 2-1.

2.1.6 I-80 INTEGRATED CORRIDOR MOBILITY (ICM) - FINAL TRAFFIC OPERATIONS ANALYSIS REPORT (2011)

Description: The East Bay SMART Corridor Program, which includes San Pablo Avenue, is an existing multimodal Advanced Transportation Management System (ATMS) along the corridor. The program, which took effect in 2003, is a cooperative effort by the California Department of Transportation (Caltrans), MTC, Alameda CTC, CCTA and 15 local agencies.

- The Project includes five major components:

- Adaptive ramp metering;
- Incident management;
- Information to motorists regarding transit and traffic travel time;
- Improvements along San Pablo Avenue and other arterials; and
- System Integration.

The Traffic Operations Analysis Report summarizes the results of the traffic operational simulation and analysis for the comparison of ICM scenarios within the I-80 corridor. The operational analysis of the I-80 ICM project focused on the 21-mile segment of I-80 from just east of the Bay Bridge Toll Plaza in Oakland to the Carquinez Bridge in Crockett. The network includes all the interchanges and freeway-to-freeway connectors along I-80, the major alternative parallel arterial (San Pablo Avenue), the roadway connectors between I-80 and San Pablo Avenue, and selected local intersections.

Outcomes relevant to the Project: see summary in Table 2-1. The improvements evaluated in the report have since been implemented.

2.1.7 MTC CORE CAPACITY STUDY - FINAL REPORT (2017)

Description: The Bay Area Core Capacity Transit Study (CCTS) is a collaborative multiagency effort to examine the transit system's capacity limitations and identify and prioritize the major investments needed to address these limitations today and in the future. The purpose of the CCTS is to answer the following question: what types of transit investments are needed, and when, to safely and reliably move a growing number of people to and from San Francisco's core job centers?

The CCTS identifies transit capacity investment projects to address shortfalls over the short, medium, and long term. The investments were developed with consideration of future transit demand, driven by growth in employment projected by the CCTS market assessment. The study recommends projects in the short and medium term, and strongly advocates for developing and selecting a long-term project in the near future.

Outcomes relevant to the Project: There is no specific mentioning in the final Report of San Pablo Avenue or transit service on San Pablo Avenue. However, several of the considered project "Packages" list as a common prerequisite the increase of Transbay bus service, without mentioning a specific AC Transit Transbay route. As some of AC Transit's Transbay routes operate on San Pablo Avenue there is some level of relationship between the recommended improvements and transit service on San Pablo Avenue.

2.1.8 CALTRANS SMART MOBILITY FRAMEWORK (SMART MOBILITY 2010: A CALL TO ACTION FOR THE NEW DECADE)

Description: Introducing new approaches to solving the mobility crunch faced by the State's households and businesses, the Smart Mobility Framework places new concepts and tools alongside well-established ones.

The publication:

- Focuses attention on Smart Mobility as a response to the State's interrelated challenges of mobility and sustainability.
- Introduces the six principles that shape the Smart Mobility Framework: Location Efficiency, Reliable Mobility, Health and Safety, Environmental Stewardship, Social Equity, and Robust Economy.
- Introduces the concept of place types (Chapter 3). Seven place types are specifically designed as tools for planning and programming that implement Smart Mobility. The place types are: Urban Centers, Close-in Compact Communities, Compact Communities, Suburban areas, Rural and Agricultural Lands, Protected Lands, and Special Use Areas.
- Presents a set of 17 Smart Mobility Performance Measures (Chapter 4), similar to metrics presently used by Caltrans but redefined to better achieve the Smart Mobility Principles.
- Offers summary comments about moving forward with Smart Mobility (Chapter 5).
- Includes, in an extensive Resources section (Chapter 6), materials that illustrate best practices and provide research evidence of the benefits of a Smart Mobility approach.
- Illustrates the application of Smart Mobility Performance Measures using three hypothetical examples (Appendix B of the document)
- Creates an Action Plan (Appendix C of the document) identifying projects and programs that apply the concepts, methods, and resources essential for implementation of the Smart Mobility Framework.

Outcomes relevant to the Project: see summary in Table 2-1. In general, the Project incorporates many elements of the Smart Mobility Framework. The Project applies the six principles of the framework, incorporates place types and multimodal performance measures into the evaluation of system needs to ultimately inform the development of Project Concepts.

2.1.9 CALTRANS BICYCLE PLAN (2017-ONGOING)

The District 4 Bicycle Plan is being developed within the framework of *Toward an Active California*, the State Bicycle and Pedestrian Plan. This framework includes an overall vision, goals, objectives, and strategies that are intended to shape the statewide policy direction in California. The District 4 Bicycle Plan adopts this framework and will

identify and prioritize investments to improve bicycling on and across the State-owned transportation network. The plan will complement and build on statewide, regional, and local planning efforts to help create a connected, comfortable, and safer bicycle network for the Bay Area. The plan is currently still under development.

Outcomes relevant to the Project: Work-to-date included two rounds of community feedback, the development of an opportunities and constraints map for Highway 123/San Pablo Avenue, and the inclusion of a series of potential (mostly) crossing improvement projects on a list of Draft District 4 Bike Plan Proposed Projects. Also see summary in Table 2-1.

2.2 JURISDICTIONAL PLANS

In addition to the agency-led studies and plans, the following jurisdictional General Plans, Specific Plans, Bicycle, and Pedestrian Plans of the cities along the San Pablo Avenue Corridor were reviewed for relevant transportation, land use context, and urban design related designations applicable to San Pablo Avenue or corridor-adjacent areas (e.g. activity centers) and recommendations for modal or streetscape related improvements. The paragraphs below provide a brief summary of key content from each of the reviewed documents organized by jurisdiction (south to north). A more detailed overview of the findings from the document review is provided in **Table A-1** located in Appendix A.

2.2.1 CITY OF OAKLAND

The jurisdictional plans reviewed for the City of Oakland include the following: *General Plan (LUTE) (1998), Pedestrian Master Plan Update (2017), Bicycle Master Plan (2007).*

Oakland's General Plan identifies the Project Corridor as a Regional Transit Street. The just updated Pedestrian Master Plan classifies the San Pablo Avenue/West Grand Avenue Intersection as a medium tier high injury intersection and makes recommendations for improvements. The plan does not assign a significant role to San Pablo Avenue with respect to the pedestrian network. The 2007 Bicycle Plan, which is currently undergoing an update, identifies the Project Corridor as a Class 2 (Frank Ogawa Plaza to 19th Street) and Class 3A/Arterial Bike Route (19th Street to 32nd Street).

See Table A-1 for additional details.

Potential Conflicts with reviewed Agency Plans: none.

2.2.2 CITY OF EMERYVILLE

The jurisdictional plans reviewed for the City of Emeryville include the following: *General Plan (2015) and Pedestrian and Bicycle Plan (2012).*

The City of Emeryville's General Plans identifies the area between 36th and 47th Streets as the San Pablo Avenue Corridor District with the goal of developing this segment as a walkable, green, mixed-use neighborhood center, with an array of amenities and services. This is consistent with the Plan's designation of the majority of San Pablo Avenue in Emeryville as a Pedestrian Priority Zone. However, the General Plan also assigns a number of vehicle related designations to the Project Corridor, including Transit Street, Truck Route, Emergency Response Route, and Regional Access Route.

The 2012 Pedestrian and Bicycle Master Plan identifies the Project Corridor segment between 53rd and 36th Streets for a "Corridor Redesign". The redesign is to consider pedestrian-friendly crossing improvements at all intersections of San Pablo Avenue and be accompanied by a "greening" study that could include bulb-outs for bioretention areas. With respect to the bicycle network, the Plan recommends bicycle crossing improvements are called for at 53rd Street, 45th Street, and MacArthur Boulevard as well as shared lane markings (sharrows) on San Pablo Avenue.

See Table A-1 for additional details.

Potential Conflicts with reviewed Agency Plans: Implementation of curb extensions for bioretention areas or shortening crossing distance may limit the space available for dedicated BRT transit lanes or bicycle facilities. The multitude of designations for San Pablo Avenue will likely require the identification of tradeoffs and compromise solutions for the accommodation of the identified needs.

2.2.3 CITY OF BERKELEY

The jurisdictional plans reviewed for the City of Berkeley include the following: *General Plan (2003), Bicycle Master Plan (2017), Pedestrian Master Plan (2010).*

Berkeley's General Plan identifies the length of the Project Corridor as both a Major Corridor and Emergency Access Route. The Project Corridor is also designated as a Commercial Corridor, with two sub-areas identified as Commercial Districts (San Pablo at University and San Pablo at Gilman).

The 2017 Bicycle Master Plan classifies the length of the Project Corridor as only being suitable to strong and fearless riders (LTS4). The Plan's most significant (Tier 1) recommendation with respect to San Pablo Avenue is to conduct a study that determines the feasibility of accommodating cycle track along the Corridor while considering its significance as a primary transit route.

The 2010 Pedestrian Master Plan identifies a series of recommended intersection improvement projects along San Pablo Avenue. Recommended improvements for the San Pablo Avenue/Delaware Street intersection include bulb-outs onto San Pablo Avenue.

See Table A-1 for additional details.

Potential Conflicts with reviewed Agency Plans: Implementation of cycle track – if identified by study as feasible may limit the space available for potential future dedicated BRT lanes. The implementation of bulb-outs onto San Pablo Avenue as part of recommended intersection improvements could have similar space limiting effects.

2.2.4 CITY OF ALBANY

The jurisdictional plans reviewed for the City of Albany include the following: *General Plan (2016), Active Transportation Plan (2012), Albany Complete Streets Conceptual Design and Plan San Pablo Avenue and Buchanan Street (2012).*

Albany's General Plan identifies the Solano Avenue/San Pablo Avenue intersection area and the segment of San Pablo between Clay Street to northern City limit as Major Activity Nodes, with the Solano Avenue intersection targeted to be reinforced as the commercial hub of Albany. The Plan also calls for Class 4 protected bike lanes on the Project Corridor between the southern City limit and Marin Avenue and the implementation of pedestrian network improvements recommended in the 2012 Active Transportation Plan. This Plan includes a range of recommended intersection and crossing improvements at intersections on San Pablo Avenue. The recommended intersection improvements include potential bulb-outs onto San Pablo Avenue. A new signal is proposed at the Southern Washington Avenue/San Pablo Avenue intersection.

In addition, the City of Albany prepared the Complete Streets Conceptual Design and Plan for San Pablo and Buchanan on the basis of which the City was awarded a Cycle 1 ATP grant for the development of construction plans for bulb outs, medians, crosswalks and a cycle track between the two legs of Washington Avenue that intersect with San Pablo Avenue. Plans for these improvements are currently at the 35 % PS&E level of design and moving into the 65% PS&E phase.

See Table A-1 for additional details.

Potential Conflicts with reviewed Agency Plans: The implementation of bulb-outs onto San Pablo Avenue as part of recommended intersection improvements may limit the space available for potential future dedicated BRT lanes. The recently constructed short segment of cycle track may have similar effects.

2.2.5 CITY OF EL CERRITO

The jurisdictional plans reviewed for the City of El Cerrito include the following: *General Plan (2014), San Pablo Avenue Specific Plan (2014).*

The General Plan assigns three Activity Centers along San Pablo Avenue in El Cerrito:

1. Del Norte Activity Center (Knott Avenue to Blake Street)
2. Midtown Activity Center (Jefferson Avenue to Waldo Avenue)

3. El Cerrito Plaza Activity Center (Southern City limit to Central Avenue)

In addition, the Project Corridor is identified as a Truck Route and Emergency Response Route (bicycle and pedestrian designations are discussed below).

Intent of the 2014 San Pablo Avenue Specific Plan is to create a framework for transforming San Pablo Avenue into a multimodal corridor that functions, not just as a thoroughfare, but as a place that provides a multitude of opportunities for living, working and community life. The Specific Plan reaffirms and further elaborates on the envisioned land uses and urban design for each of the three Activity Centers identified by the General Plan (see above). It also recommends a range of street-related improvements for the length of San Pablo Avenue, including crosswalk enhancements, mid-block crossings, bus bulbs to improve transit service, landscaped bulb-outs at select locations, landscaped median and sidewalk buffers, such as trees, rain gardens, etc. (Note: Similar Improvements are proposed as part of the 2016 El Cerrito Active Transportation Plan).

In addition, the Specific Plan recommends the implementation of one-way cycle tracks between Potrero Avenue to Lincoln Avenue, Class 2 bicycle lanes between Wall Avenue to Potrero Avenue, and Class 3 bicycle route between the northern City limit and Wall Avenue as well as Lincoln Avenue and the southern City limit. In addition, the General Plan includes the option for a Call 3 bicycle route between Knott and Wall Avenues.

See Table A-1 for additional details.

Potential Conflicts with reviewed Agency Plans: The implementation of bulb-outs onto San Pablo Avenue as part of recommended corridor-wide improvements may limit the space available for potential future dedicated BRT lanes. The recommendation to implement one-way cycle tracks between Potrero Avenue to Lincoln Avenue may have similar effects.

2.2.6 CITY OF RICHMOND

The jurisdictional plans reviewed for the City of Richmond include the following: *General Plan (2012), Bicycle Plan (2011), Pedestrian Master Plan (2011).*

The General Plan assigns the following Activity Centers along San Pablo Avenue in Richmond:

1. Area at San Pablo/Macdonald Avenue Intersection
2. Area at San Pablo/Barrett Avenue Intersection
3. Area at San Pablo/Solano Avenue Intersection
4. Area at San Pablo/McBride Avenue Intersection
5. San Marcos Apartment Complex Area

The Plan also designates the length of San Pablo Avenue as a Community Connector, which is defined as a street that links neighborhoods to other parts of the City and prioritizes public transit. For the automobile network, the Plan designates the length of the street as a Route of Regional Significance.

The 2011 Bicycle Plan proposes Class 2 bicycle lanes between Stanton Avenue and Richmond Parkway and a Class 3 bicycle route from Lowell Avenue to Barrett Avenue.

The 2011 Pedestrian Plan identifies San Pablo Avenue as a Key Corridor and recommends a range of short- to long-term improvements (also see Table A-1). The list of long-term improvements includes the potential introduction of new landscaped medians and bulb-outs.

Note: Planned designations and improvements for the segment of San Pablo Avenue in Richmond where the city limits of the Cities of Richmond and El Cerrito both abut opposite sides of the Corridor, are described above under El Cerrito's San Pablo Avenue Specific Plan.

See Table A-1 for additional details.

Potential Conflicts with reviewed Agency Plans: The potential implementation of bulb-outs onto San Pablo Avenue as part of improvements contemplated by the Pedestrian Master Plan may limit the space available for potential future dedicated BRT lanes.

2.2.7 CITY OF SAN PABLO

The jurisdictional plans reviewed for the City of San Pablo include the following: *General Plan (2011), Bicycle and Pedestrian Master Plan (2017), San Pablo Avenue Specific Plan (2011), and San Pablo Complete Streets Study (2013).*

The General Plan identifies the area between Mission Plaza and Rheem Avenue as a San Pablo Avenue Subarea. North of 23rd Street within this area, the Plan envisions a pedestrian-friendly, neighborhood-serving mixed-use district with office. While for the area south of 23rd Street, the Plan envisions an entertainment/regional-serving district with a themed streetscape and outdoor gathering spaces.

The Plan also designates the segment of San Pablo Avenue north of Rivers Street as an Auto Arterial, where automobiles and trucks are prioritized, pedestrians are "incidental", and bicyclists are accommodated. The segment south of Rivers Street is designated a Mixed-Use Boulevard, where automobiles and bicycles are accommodated but in case of conflict, transit has priority. The length of the Corridor has a Green Street overlay, which calls for continuous rows of trees along the street. South of Lake Street, San Pablo Avenue is designated as a Pedestrian Priority Zone. A transit Hub is designated northeast of San Pablo/El Portal intersection.

The 2017 Bicycle and Pedestrian Master Plan includes the majority of San Pablo Avenue within its Pedestrian Priority Network. The Plan also proposes a study (see Complete Streets Study below) to determine whether the implementation of Class 2, 3, or 4 facilities is most appropriate beyond the segments of existing Class 2 bicycle lanes.

The 2011 San Pablo Avenue Specific Plan identifies several Focus Areas for future development (Mission Plaza, West San Pablo Avenue, Circle S, Towne Center, South San Pablo Avenue). In addition, the following Pedestrian Priority Zones are identified: Lake Street to 23rd Street, Van Ness Street to Evergreen Terrace, Vale road to San Pablo Dam Road along with Streetscape Concept Areas, which include segments of signature landscape and hardscape improvements (see Table A-1 for additional details regarding proposed cross section elements and dimensions). The listed long-term improvements include the potential introduction of new landscaped medians and bulb-outs.

The 2013 San Pablo Avenue Complete Streets Study recommends the implementation of Class 2 Class 2 Enhanced buffered bicycle lanes Rivers Street to Hilltop Drive and a range of streetscape improvements, such as new sidewalk, pedestrian scale lighting, crosswalk enhancements, and new landscaped medians, for the segment from Hilltop Drive to Rivers Street.

See Table A-1 for additional details.

Potential Conflicts with reviewed Agency Plans: The potential implementation of bulb-outs on San Pablo Avenue as part of improvements contemplated by the San Pablo Avenue Specific Plan and the San Pablo Complete Streets Study may limit the space available for potential future dedicated BRT lanes. Note that the development of PS&E for some of these improvements is under way.

2.3 FUNDED TRANSPORTATION PROJECTS

This section was intended to provide an overview of currently funded transportation projects. However, little information was actually received from agencies and local jurisdictions during the data collection period for the Project. **Table A-2** located in Appendix A summarizes this information and also includes a placeholder for an AC Transit project that was mentioned as having been funded but for which no further information was received from AC Transit itself.

2.4 KEY FINDINGS

A key finding from reviewing the above listed agency-led and jurisdictional plans and studies is that San Pablo Avenue is viewed by agencies and local jurisdictions alike as a critical multimodal transportation corridor and, in addition, by most cities as an important place – currently or envisioned – for the economic and cultural life of their respective communities. Section 2.4.3 and 2.4.4 below touch on potential conflicts

between the reviewed agency and jurisdictions plans and the key takeaways from the review of the plans.

2.4.1 TRANSPORTATION

Nearly all of the agency-led and jurisdictional plans and studies identify San Pablo Avenue as a major transit corridor with importance to both regional and local transit service. This is evidenced by the fact that several of the agency-led plans include specific proposals for the future implementation of Rapid (Express Bus)-type or Bus Rapid Transit (BRT) service on the Project Corridor (e.g. Alameda CTC Countywide Transit Plan (2016), AC Transit Major Investment Study (2016), the West County High-Capacity Transit Study (2017), and Contra Costa County Countywide Comprehensive Transportation Plan Update: Volumes 1 and 2 (2017). San Pablo Avenue's function as a key transit corridor is also recognized by most jurisdictional plans, this however does not necessarily extend to the potential introduction of dedicated lanes, which, for instance, was contemplated by the San Pablo Avenue Specific Plan process in San Pablo but discarded as a concept along the way.

With respect to bicycle facilities, jurisdictional plans include designations that range from Class 3 bicycle route along segments in Oakland to proposed Class 4 cycle track along stretches in the City of Albany and El Cerrito. The City of Berkeley's 2017 Bicycle Master Plan specifically recognizes that the feasibility of Class 4 cycle track along San Pablo Avenue – designated a Primary Transit Route in Berkeley – requires further study. In addition, the Draft Proposed Projects List in Caltrans District 4's Bicycle Plan includes a series of crossing improvements at controlled and uncontrolled intersections. Most of the listed intersections are located in Berkeley, some in Oakland and Emeryville.

General and Specific Plans from Emeryville, Albany, El Cerrito, Richmond, and San Pablo all include references to the importance of pedestrian accommodation along segments of San Pablo identified as Activity Areas or Pedestrian Priority Zones or Activity Nodes. Most plans identify desired longitudinal and/or crossing improvements to areas with these designations.

While Alameda CTC's Countywide Bicycle Plan does not include specifically mention San Pablo Avenue, the Countywide Pedestrian Plan includes segments of San Pablo Avenue in its "vision network" because of their importance with respect to access to transit.

2.4.2 URBAN DESIGN

The review of jurisdictional General Plans and Specific Plans also revealed that many jurisdictions view nodes, districts, or areas located along San Pablo Avenue as opportunities for accommodating future growth and as places that can be improved to become more supportive and accommodating of the needs of surrounding neighborhoods and their larger community. Several jurisdictions have developed local

visions, policies, and recommendations for future changes to the land use context along the Project Corridor along with desired changes to the urban design character of these areas as well as the streetscape appearance of San Pablo Avenue itself (e.g. San Pablo, El Cerrito, Richmond, Albany, and Emeryville). In most cases, this approach is coupled with a Complete Streets approach to the design of desired transportation improvements along the Project Corridor.

2.4.3 POTENTIAL CONFLICTS

Some of the reviewed jurisdictional plans included detailed recommendations related to desired changes in the current allocation of the right of way in order to gain space for bicycle facilities, transit stops, streetscape and pedestrian improvements (e.g. San Pablo's and El Cerrito's San Pablo Avenue Specific Plans). Some of the planned improvements include the construction of widened sidewalks, raised and landscaped medians, protected cycle tracks, and bus bulbs or curb extensions. If implemented, any projects that reduce the curb-to-curb space width of the roadway, such as bus bulbs, curb extensions, or new raised medians could potentially be in conflict with recommendations for the future allocation of right of way for improvements such as dedicated transit facilities or protected cycle tracks. Depending on the actual available right-of-way in a given segment of the Project Corridor, such improvements could also be developed in ways to be synergistic with future transit priority or bicycle or pedestrian safety improvements, depending on the specific design and location.

2.4.4 KEY TAKEAWAYS

Because most of the jurisdictional plans that directly address San Pablo Avenue or otherwise place modal or place designation on the Project Corridor were created without significant cross-jurisdictional coordination of transportation or urban design considerations (except for the coordination between the Cities of El Cerrito and Richmond in the preparation of the San Pablo Avenue Specific Plan), it is recommended that the more detailed information from the plans summarized in Table A-1 be closely reviewed during the Project Concept development phase of the San Pablo Avenue Corridor Study. In addition, many of the plans focused on near-term and/or modal improvements, so tradeoffs between modes and impacts of near-term improvements on long-term options will need to be evaluated in more detail.

In addition, the review of past planning efforts revealed that the transit service improvements envisioned for the long term by regional/county-level and transit agencies have yet to be reconciled with the street's function as part of the I-80 Smart Corridor Project and the varying jurisdictional modal and place designations.

The next stage of this project will take these jurisdictional priorities and preferences into account and identify the tradeoffs between competing visions as well as between long-term visions and already planned shorter-term improvements. This will require using a

context sensitive design approach to developing viable long-term scenarios and short-term improvements for the Project Corridor.

3. TRANSIT

3.1 EXISTING TRANSIT NETWORK

This section provides a summary of the public transportation providers and associated transit services along the corridor, listed below. **Figure 3-1** shows the existing transit network in the Study Area.

- **Alameda-Contra Costa Transit District (AC Transit)**. AC Transit provides transit service to 13 cities and unincorporated areas across Alameda and Contra Costa Counties. In the Study Area, AC Transit provides Local, School, Transbay, and Rapid service.
- **Western Contra Costa Transit Authority (WestCAT).** WestCAT provides transit service to El Cerrito del Norte BART station, the cities of Pinole and Hercules, and unincorporated areas across western Contra Costa County. WestCAT also provides express bus service to San Francisco.
- **Bay Area Rapid Transit (BART).** BART provides rapid public transportation to the San Francisco Bay Area, connecting San Francisco to Alameda, Contra Costa, Santa Clara and San Mateo counties.
- **Emeryville Transportation Management Association (Emery Go-Round).** Emery Go-Round provides free public bus service throughout Emeryville and into Oakland and Berkeley. All four Emery Go-Round bus routes run within the Study Area.

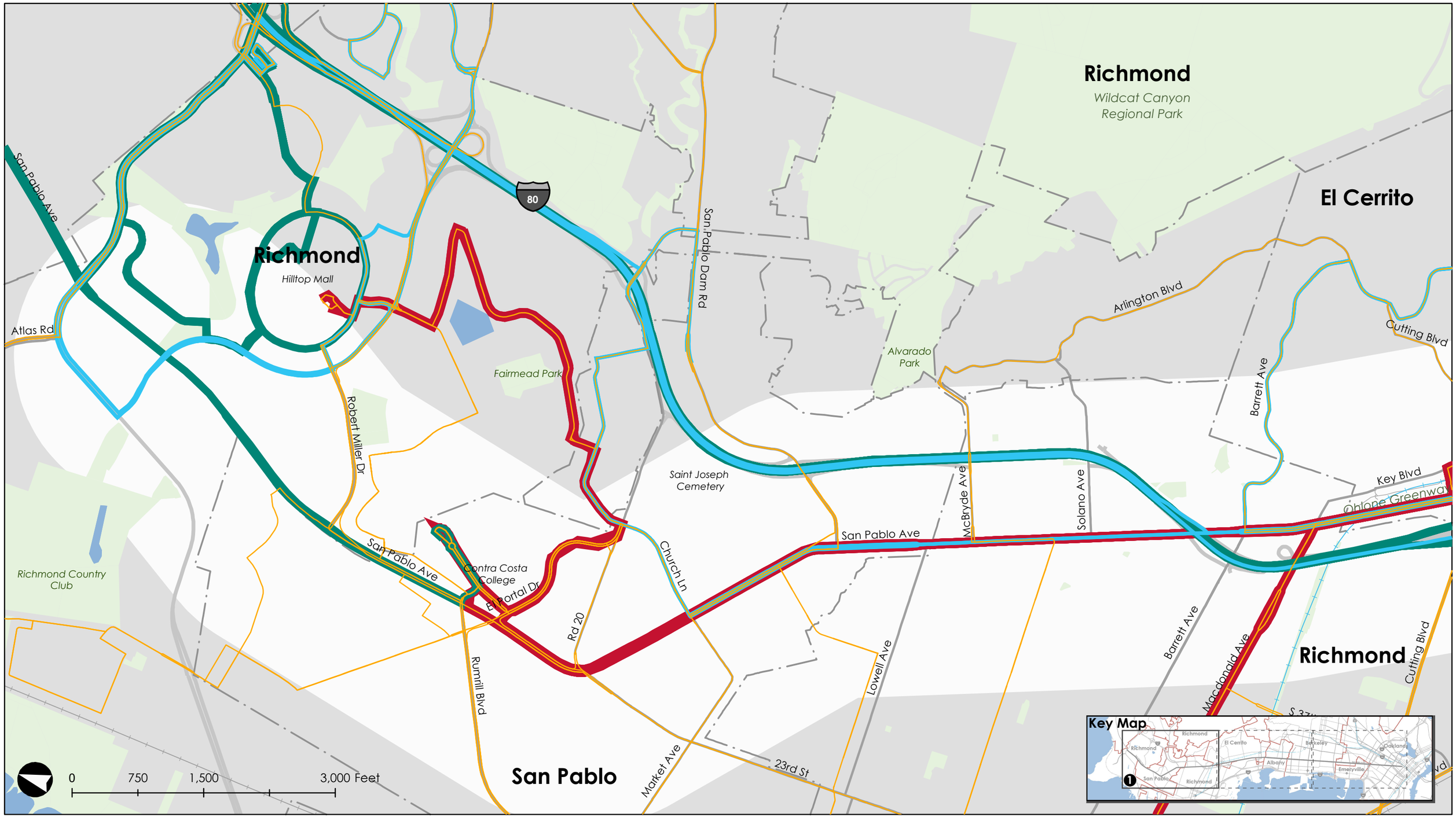
Additional express and commuter service to El Cerrito del Norte BART Station is provided by Golden Gate Transit, Solano Express, Fairfield-Suisun Transit, and Vallejo Transit.

3.1.1 AC TRANSIT

3.1.1.1 Bus Routes

AC Transit provides bus service within and around the East Bay and in the Study Area via Local, Rapid, School, All-Nighter, and Transbay service (**Table 3-1**). Local and Rapid routes provide day- and night-time service to the East Bay. School bus routes follow the hours of local schools, but all riders have access to those routes. All-Nighter bus routes operate when BART is closed, from 1:00 AM to 5:00 AM daily. Transbay routes connect the East Bay to San Francisco or the Peninsula.

In terms of transit supply on the corridor, a total of 1,233 one-way bus trips are provided in the corridor each weekday. On weekends, 851 one-way bus trips are provided on Saturday and 874 are provided on Sunday. The segment of San Pablo Avenue with the most transit service is between Marin Avenue and Buchanan Street, where 364 total daily one-way bus trips occur. The segment of San Pablo Avenue with the least transit service is north of Robert Miller Drive (Richmond), where no AC Transit service is



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space
- AC Transit Local Routes
- AC Transit Transbay Routes
- Emery Go-Round Routes
- Westcat Routes
- AC Transit Local Routes 72 and 72M and Rapid Route 72R

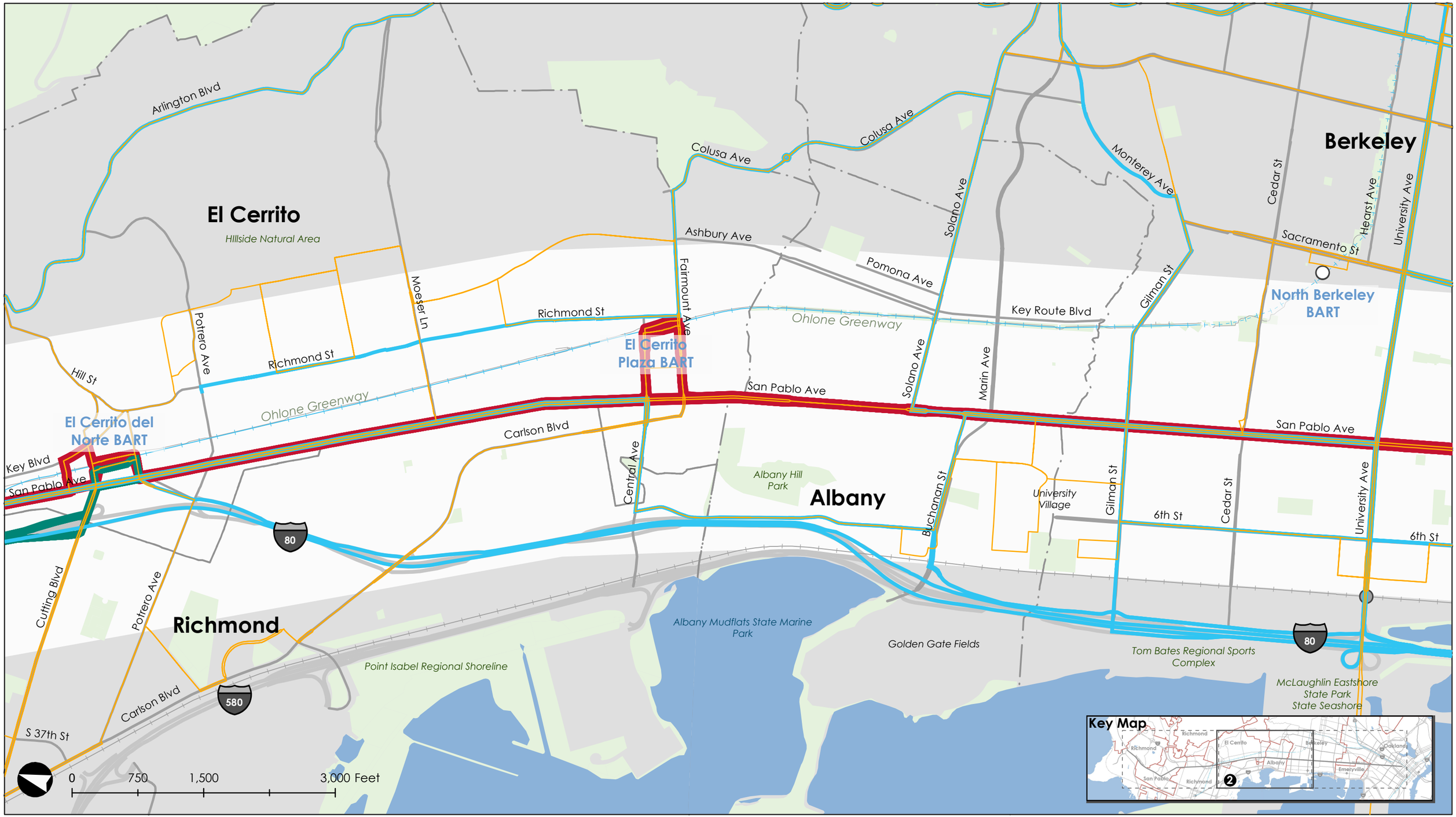
Note: Additional Express/Commuter service to El Cerrito del Norte BART Station provided by Golden Gate Transit, Solano Express, Fairfield-Suisun Transit, and Vallejo Transit.

Source: AC Transit, Emeryville TMA, WCCTAC

San Pablo Avenue Corridor Project

Figure 3-1.1 Existing Transit Network

San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard



Legend:

- BART Station
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- AC Transit Local Routes 72 and 72M and Rapid Route 72R

Note: Additional Express/Commuter service to El Cerrito del Norte BART Station provided by Golden Gate Transit, Solano Express, Fairfield-Suisun Transit, and Vallejo Transit.

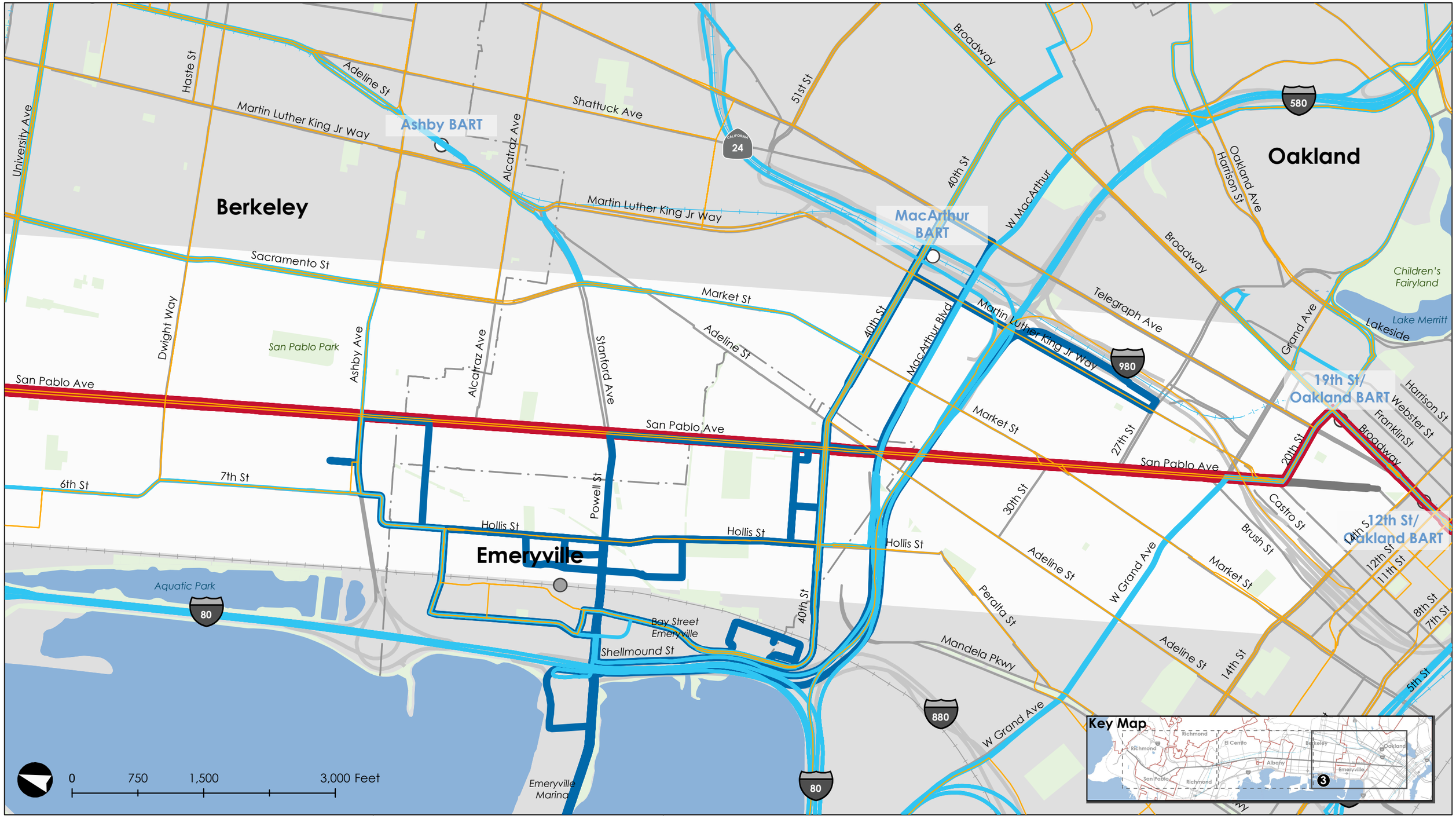
Source: AC Transit, Emeryville TMA, WCCTAC

ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 3-1.2 Existing Transit Network

San Pablo Corridor between Cutting Boulevard and University Avenue



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space
- AC Transit Local Routes
- AC Transit Transbay Routes
- Emery Go-Round Routes
- Westcat Routes
- AC Transit Local Routes 72 and 72M and Rapid Route 72R

ALAMEDA County Transportation Commission

Note: Additional Express/Commuter service to El Cerrito del Norte BART Station provided by Golden Gate Transit, Solano Express, Fairfield-Suisun Transit, and Vallejo Transit.

Source: AC Transit, Emeryville TMA, WCCTAC

San Pablo Avenue Corridor Project

Figure 3-1.3 Existing Transit Network

San Pablo Corridor between University Avenue and Frank Ogawa Plaza

provided during peak periods directly on San Pablo Avenue. Table 3-1 summarizes the span and headway for AC Transit routes that operate in the Study Area.

AC Transit Local Routes 72, 72M, and Rapid Route 72R all run along most of San Pablo Avenue, beginning at Jack London Square in Oakland. Route 72M diverges from San Pablo Avenue at Macdonald Avenue and continues west to terminate in Point Richmond. Route 72R terminates at Contra Costa College, and Route 72 continues further north and terminates at The Shops at Hilltop. Routes 72 and 72M have a typical combined headway of 15 minutes during peak periods and throughout the day and 30 minutes during early morning and late evening service, alternating between 72 and 72M service. The 72R has a consistent 12-minute headway throughout the day and evening.

TABLE 3-1: AC TRANSIT EXISTING ROUTES WITHIN STUDY AREA

Route	Route Type	Weekday Span	Weekday Headway (Min)	Route Details
7	Local	5:45 AM – 8:50 PM	30	El Cerrito del Norte BART to Downtown Berkeley via Arlington Ave. and Shattuck Ave.
18	Local	5:15 AM – 12:46 AM	15 – 30	University Village, Albany, to Lake Merritt BART via Solano Ave., Shattuck Ave., Children's Hospital, Martin Luther King Jr. Way, Downtown Oakland and 7th / 8th streets.
29	Local	5:57 AM – 10:45 PM	20 – 30	Emeryville Public Market to Lakeshore Ave. & Wala Vista Ave., Oakland, via 65th St., Hollis St., Peralta St., West Oakland BART, 10th St., 11th/12th streets, and Lakeshore Ave.
51B	Local	4:57 AM – 11:50 PM	10 – 20	Rockridge BART to Berkeley Amtrak or Berkeley Marina via College Ave, Bancroft Way / Durant Ave, Shattuck Ave, Berkeley BART, and University Ave.

TABLE 3-1: AC TRANSIT EXISTING ROUTES WITHIN STUDY AREA				
Route	Route Type	Weekday Span	Weekday Headway (Min)	Route Details
52	Local	5:53 AM – 11:46 PM	15 – 20	University Village to UC campus via University Village, Cedar St., Sacramento St., and University Ave., looping the UC campus via Hearst Ave., Gayley St., Bancroft Way, and Shattuck Ave. (Downtown Berkeley).
70	Local	5:58 AM – 8:47 PM	30	Richmond BART to Richmond Pkwy. Transit Center via 18th St., Rheem Ave., Doctor's Medical Center, San Pablo Dam Rd., Appian Way and Fitzgerald Dr.
71	Local	5:00 AM – 8:43 PM	30	El Cerrito Plaza BART to Richmond Parkway Transit Center via Carlson Blvd., Richmond BART, Rumrill Blvd., Contra Costa College, Parchester Village, Giant Highway, Atlas Rd., and Richmond Parkway.
72	Local	4:53 AM – 1:14 AM	30 – 40	Hilltop Mall to Jack London Square via Moyers Rd., Contra Costa College, San Pablo Ave., El Cerrito del Norte BART, and downtown Oakland.
72M	Local	4:45 AM – 12:24 AM	30 – 40	Point Richmond to Jack London Square via Garrard Blvd., Macdonald Ave., El Cerrito del Norte BART, San Pablo Ave. and downtown Oakland
72R	Rapid	6:01 AM – 8:18 PM	12	Contra Costa College to Jack London Square via El Cerrito del Norte BART, San Pablo Ave. and downtown Oakland.

TABLE 3-1: AC TRANSIT EXISTING ROUTES WITHIN STUDY AREA				
Route	Route Type	Weekday Span	Weekday Headway (Min)	Route Details
74	Local	5:28 AM – 10:33 PM	30	Marina Bay, Richmond to Castro Ranch Rd. & San Pablo Dam Rd., El Sobrante, via Richmond BART, 23rd St., Contra Costa College and San Pablo Dam Rd. Weekends, some trips travel from Contra Costa College to Hilltop Mall.
76	Local	5:23 AM – 9:46 PM	30	El Cerrito del Norte BART to Hilltop Mall via Cutting Blvd., Richmond BART, North Richmond, Market St., Church Lane, Road 20, Contra Costa College, Birmingham Dr. and Shane Rd.
80	Local	6:08 AM – 12:32 AM	30 – 40	El Cerrito Plaza BART to Ashby Ave. & Claremont Ave. via Central Ave, Pierce St., Pacific East Mall, University Village, 6th St., Berkeley Amtrak, 7th St., and Ashby Ave.
81	Local	6:21 AM – 12:48 AM	30	Berkeley Marina to Ashby Ave. & Claremont Ave. via University Ave., Berkeley Amtrak, 7th St., and Ashby Ave.
88	Local	5:14 AM – 10:32 PM	15 – 20	From Downtown Berkeley to Lake Merritt BART via University Ave., Sacramento St., Market St. and downtown Oakland.

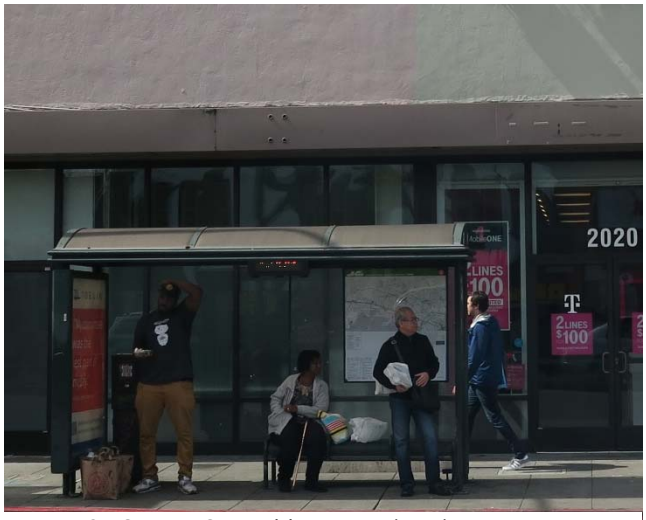
TABLE 3-1: AC TRANSIT EXISTING ROUTES WITHIN STUDY AREA				
Route	Route Type	Weekday Span	Weekday Headway (Min)	Route Details
376	Local	7:51 PM – 4:03 AM	30	El Cerrito Del Norte BART to Pinole Vista via Cutting Blvd., Richmond BART, North Richmond, Contra Costa College, Parchester Village, and Richmond Pkwy. Return via Richmond Parkway Transit Center and Hilltop Mall.
667	School	7:05 AM – 7:45 AM, 1:12 PM – 4:18 PM	1 daily trip (AM), 6 daily trips (PM)	Market St. & 6th St., North Richmond to El Cerrito High School and Korematsu Middle School via Market St., Fred Jackson Way, 7th St., Macdonald Ave. and San Pablo Ave.
668	School	7:05 AM – 7:40 AM, 1:12 PM – 4:14 PM	1 daily trip (AM), 6 daily trips (PM)	Richmond BART to El Cerrito High School and Portola Middle School via Harbour Way, Cutting Blvd. and San Pablo Ave.
800	All-Nighter	12:16 AM – 6:24 AM	60	Richmond BART to Market St. & Van Ness Ave., S.F. (Weekends: 24th St. BART), via San Pablo Ave., University Ave., Telegraph Ave. and downtown Oakland. Returns via Market St., the Transbay Temp. Terminal, and West Oakland BART.
802	All-Nighter	12:13 AM – 5:34 AM	60	Berkeley Amtrak to downtown Oakland via San Pablo Ave.
G	Transbay	5:31 AM – 9:50 AM, 4:40 PM – 8:17 PM	30 – 60	Richmond St. & Potrero St., El Cerrito to Transbay Temporary Terminal, San Francisco via Colusa Ave., Solano Ave. and San Pablo Ave.

TABLE 3-1: AC TRANSIT EXISTING ROUTES WITHIN STUDY AREA				
Route	Route Type	Weekday Span	Weekday Headway (Min)	Route Details
H	Transbay	6:10 AM – 9:13 AM, 4:15 PM – 8:17 PM	20	Barrett Ave. & San Pablo Ave., El Cerrito, to Transbay Temporary Terminal, San Francisco via Arlington Ave., Monterey Ave. and Gilman St.
L	Transbay	5:30 AM – 9:19 AM, 3:10 PM – 8:05 PM	15 – 50	San Pablo Dam Rd. & Princeton Plaza Shopping Center to Transbay Temporary Terminal, San Francisco via El Portal Dr., Rollingwood Dr., San Pablo Ave. and Pierce St.
LA	Transbay	5:18 AM – 9:17 AM, 3:30 PM – 8:10 PM	20 – 30	Hilltop Dr. Park & Ride to San Francisco via Hilltop Drive, Richmond Parkway and Richmond Parkway Transit Center. Some trips start from Hilltop Green Park.
LC	Transbay	7:30 PM – 10:08 PM	30 – 60	Transbay Temporary Terminal, San Francisco to Hilltop Dr. Park & Ride via I-80, Pierce St., San Pablo Ave., El Portal Dr., I-80, Richmond Pkwy. and Hilltop Dr. From San Francisco only; travel to San Francisco via line L or LA.
Z	Transbay	7:26 AM – 9:04 AM, 4:45 PM – 6:30 PM	60 – 65	Transbay Temporary Terminal, San Francisco to San Pablo Ave.& Marin Ave., Albany via Christie St., Hollis St. and Sixth St. (Continues to Buchanan St. & Pierce St. in mornings.)

Source: AC Transit, 2017

3.1.1.2 Bus Stops

A comprehensive inventory of bus stop amenities and their condition is not available. This section summarizes general observations of typical bus stop amenities and condition by type of service. Amenities at bus stops vary and may include a flag sign only (generally with route designation), a bench and trash receptacle, a transit system map, and a shelter.



Route 72R Stop at San Pablo Ave/University Ave

Based on a field visit conducted in October 2017, below is a summary of bus stop amenities and general conditions of bus stops along San Pablo Avenue:

- On average, Route 72R stops are located 0.5 miles apart and Local route stops are located 0.15 miles apart along San Pablo Avenue.
- There are 630 Local and Rapid stops within the Study Area, of which 52 are Rapid stops (all Rapid stops are also local stops). 168 of those stops are located along San Pablo Avenue, of which 41 are Rapid stops.
- Most Route 72R bus stops provide more amenities than local-only stops, including one or two shelters, benches, a system map or schedule information, and a wayfinding sign marked "Rapid" in red that denotes that the bus stop is a Rapid stop. Many 72R stops also include real-time bus arrival signage integrated into the shelter. However, some stops that serve Route 72R, particularly along the north end of the corridor, are only denoted with a wayfinding sign displaying the routes served.


Route 72R Stop at San Pablo Ave/Stanford Ave

- AC Transit local stops on San Pablo Avenue generally only consist of a flag sign with route designation and some include a bench and trash receptacle as well.
- AC Transit on-street bus stops along San Pablo Avenue are not shared with other services and serve only AC Transit routes.
- Seventy percent of Route 72R bus stops are far-side, 15 percent are near-side, and 15 percent are mid-block.
- A large number of bus stops are vandalized and display graffiti and broken glass siding. In addition, the material of many bus shelters, benches, and trash receptacles is rusted.

- Access to bus stops is not always ADA compliant, including clear path width of sidewalk, ramp grade, tactile warning strips, and sidewalk condition.
- There are no bulb-outs or in-line bus stops along San Pablo Avenue. Bus stops are primarily located in the parking lane. Concrete bus pads are provided at the majority of local and rapid stops, but not at all local stop locations.

3.1.2 WESTCAT

WestCAT provides Local, Regional, Express, and Transbay routes that connect riders within western Contra Costa County and across the bay to San Francisco. **Table 3-2** summarizes span and headway for WestCAT routes within the Study Area. WestCAT provides service on the northern end of the Study Area, connecting to El Cerrito del Norte BART Station, Contra Costa College, San Francisco, and The Shops at Hilltop.

TABLE 3-2: WESTCAT EXISTING ROUTES WITHIN STUDY AREA

Route	Route Type	Weekday Span	Weekday Headway (min)
18	Local	5:59 AM – 9:50 AM, 12:40 PM – 5:55 PM	70 – 80
19	Local	8:59 AM – 9:30 PM	40 - 50
C3	Regional	7:06 AM – 8:26 PM	30 – 35
LYNX	Transbay	5:00 AM – 10:10 PM	15 – 60
JL	Express	4:33 AM – 8:05 PM	20 – 60
JPX	Express	5:32 AM – 9:02 PM	8 - 30
JR	Express	5:18 AM – 12:14 AM	20 – 60
JX	Express	5:22 AM –8:38 AM, 3:42 PM – 8:13 PM	15

Source: WestCAT

3.1.3 BART

Bay Area Rapid Transit (BART) connects San Francisco and northern San Mateo County to cities in the East Bay with high capacity rail service. The Millbrae/Daly City – Richmond and Warm Springs/South Fremont – Richmond lines run along the same alignment through the Study Area, crossing over San Pablo Avenue in Richmond directly north of the El Cerrito del Norte BART Station (**Table 3-3**).

TABLE 3-3: BART EXISTING ROUTES WITHIN STUDY AREA		
Route	Weekday Span	Headway (min)
Millbrae/Daly City - Richmond	4:12 AM – 10:08 PM	15 – 20
Warm Springs/South Fremont - Richmond	4:00 AM – 1:34 AM	15 – 20

Source: BART

There are four BART stations in the Study Area, as summarized in **Table 3-4.** These stations are all accessible by AC Transit routes and various private transit providers.

TABLE 3-4: BART EXISTING STATIONS WITHIN STUDY AREA			
STATION	DISTANCE FROM SAN PABLO AVE (MI)	AMENITIES	SERVED BY
12th Street / Oakland	0.19	**Bike Parking** • Bike Lockers (8) **Elevators** (1)	**AC Transit:** 1, 6, 12, 14, 18, 19, 20, 29, 33, 40, 51A, 72, 72M, 72R, 88, 800, 801, 802, 805, 840, 851 **BART:** Millbrae/Daly City – Richmond, Warm Springs/ South Fremont - Richmond, Pittsburg/ Bay Point – San Francisco International Airport/ Millbrae **Broadway Shuttle:** Day Grand Ave, Day Jack London, Night Grand Ave, Night Jack London
19th Street / Oakland	0.23	**Bike Parking** • Bike Racks • Bike Station • Bike Lockers (8) **Elevators** (1)	**AC Transit:** 6, 12, 18, 33, 51A, 72, 72M, 72R, 800, 802, 805, 851 **BART:** Millbrae/Daly City – Richmond, Warm Springs/ South Fremont - Richmond, Pittsburg/ Bay Point – San Francisco International Airport/ Millbrae **Broadway Shuttle:** Day, Night

TABLE 3-4: BART EXISTING STATIONS WITHIN STUDY AREA

STATION	DISTANCE FROM SAN PABLO AVE (MI)	AMENITIES	SERVED BY
El Cerrito Plaza	0.23	**Parking (749 total spaces)** • Monthly Reserved • Daily $3 Fee • Extended Weekend • Carpool • Airport/ Long Term **Bike Parking** • Bike Racks • Bike Lockers (72) **Elevators** (2)	**AC Transit**: 71, 72, 72M, 79, 80, G **BART:** Millbrae/Daly City – Richmond, Warm Springs/South Fremont – Richmond **Bear Transit:** RFS
El Cerrito del Norte	0.06	**Parking (2,180 total spaces)** • Monthly/ Single Day Reserved • Daily $3 Fee • Extended Weekend • Carpool • Airport/ Long Term **Bike Parking** • Bike Racks • Bike Lockers (24) **Elevators** (2)	**AC Transit:** 7, 72, 72M, 72R, 76, 800 **BART:** Millbrae/Daly City – Richmond, Warm Springs/South Fremont - Richmond **FAST Transit**: 90 **Golden Gate Transit:** 40, 40X **SolTrans:** 80, 82, 90 **WestCAT:** JL, JR, JPX, JX **Vine Transit:** 29

Source: Bart 2015 Station Profile.

3.1.4 OTHER TRANSIT OPERATORS

3.1.4.1 Emery Go-Round

The Emery Go-Round is a free shuttle service open to the public provided by the Emeryville Transportation Management Association. The Emery Go-Round provides connection from the MacArthur BART Station in Oakland to locations throughout Emeryville. The Emery Go-Round operates on weekdays from 6:00AM to 10:00PM, on Saturdays from 8:00AM to 10:00PM, and on Sundays from 9:00AM to 7:00PM. All Emery Go-Round bus routes run within the Study Area. **Table 3-5** summarizes the Emery-Go-Round routes and associated weekday span and headway.

TABLE 3-5: EMERY GO-ROUND EXISTING ROUTES WITHIN STUDY AREA

Route	Weekday Span	Weekday Headway (min)
Hollis	5:45 AM – 7:16 AM, 10:00 AM – 3:27 PM, 7:00 PM – 10:32 PM	15 – 20
Hollis North	7:00 AM – 10:23 AM, 3:00 PM – 7:22 PM	10 – 15
Hollis South	7:05 AM – 10:19 AM, 3:00 PM – 7:15 PM	10
Shellmound/ Powell	5:45 AM – 7:24 AM, 10:05 AM – 3:52 PM, 7:05 PM – 10:24 PM	10 – 20
North Shellmound	7:00 AM – 10:15 AM, 3:00 PM – 7:24 PM	10 – 15
South Shellmound/ Powell	7:05 AM – 10:30 AM, 3:15 PM – 7:28 PM	10
Watergate Express	7:10 AM – 10:22 AM, 3:00 PM – 7:11 PM	15

Source: Emery-Go-Round

3.1.4.2 Other

In addition to being accessible by AC Transit, BART, and WestCAT, the El Cerrito del Norte BART Station is also served by Fairfield-Suisun Transit (FAST Transit), Golden Gate Transit, SolTrans, and VINE Transit.

- FAST Transit Express Intercity Bus Route 90 begins at El Cerrito del Norte and runs north along I-80 to the Fairfield Transportation Center.

- Golden Gate Transit Bus Route 40 service begins at El Cerrito del Norte and runs north along I-580 into Marin County.
- SolTrans Express Bus Route 82, run by Vallejo Transit, begins at El Cerrito del Norte and runs north along I-80 to the Vallejo Transit Center.
- VINE Transit Express Bus Route 29 also begins at El Cerrito del Norte and runs north along I-80, Route 29, and Route 128 to Calistoga.

A number of small shuttles and on-demand services also operate in the Study Area. Examples include but are not limited to: Bear Transit, the Free B, El Cerrito Easy Ride Paratransit Service (ERPS), and the Albany Senior Center Commuter Shuttle. Bear Transit, the UC Berkeley campus shuttle system, runs from the UC Berkeley campus north via I-80 and back south along Carlson Boulevard to terminate at El Cerrito Plaza BART Station. The Free B, a free shuttle system operated by the City of Oakland, runs along Broadway from Jack London Square to 27th Street, serving the 12th Street and 19th Street BART Stations in Oakland. El Cerrito's ERPS is an on-demand service that provides trips within the City of El Cerrito to seniors and disabled residents. The Albany Senior Center Commuter Shuttle provides service to seniors from the Albany Senior Center, located 0.25 miles from San Pablo Avenue in Albany, to desired destinations, including but not limited to walking trips, day trips, and grocery shopping. The shuttle has no set route.

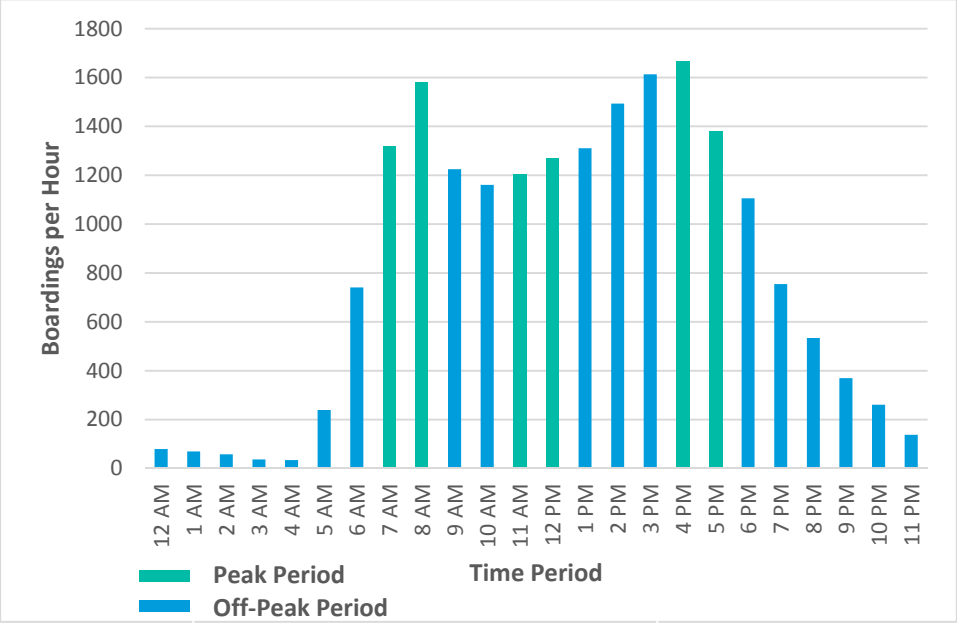
3.2 TRANSIT RIDERSHIP

The following sections summarize local transit ridership for AC Transit and BART. Data collection efforts focused on these two operators given their prominent roles throughout the corridor. Additional data may be collected from other operators as needed as potential improvements or areas of focus are identified.

3.2.1 AC TRANSIT

Table 3-6 summarizes the average weekday boardings in the Study Area by route. As summarized, Route 72R has the highest ridership within the project corridor. Route 72 and Route 72M have the highest ridership amongst the Local routes, and Route L has the highest ridership amongst the Transbay routes. There are approximately 19,600 weekday boardings on AC Transit buses in the Study Area; 57 percent of these boardings occur at bus stops along San Pablo Avenue. **Graph 3-1** depicts the average weekday boardings by hour in the Study Area. Boardings are spread relatively evenly across the day: fifteen percent of daily boardings in the Study Area occur in the AM peak period (7:00 AM to 9:00 AM), 13 percent occur in the midday peak period (11: 00 AM to 1:00 PM), and 16 percent occur in the PM peak period (4:00 PM to 6:00 PM). Sixteen percent of daily boardings occur between 2:00 PM to 4:00 PM, correlating with the end of the school day. The remaining 40% of boardings occur in other non-peak periods

Graph 3-1. AC Transit Boardings by Hour in Study Area



Source: AC Transit
Note: The PM peak is defined as 4:00PM-6:00PM, corresponding to the highest period of transportation activity on the corridor; however, the after-school peak (2:00PM-4:00PM) experiences a high level of bus passenger activity.

TABLE 3-6: WEEKDAY BOARDINGS BY ROUTE WITHIN STUDY AREA

Route	Total Weekday Boardings	Total Weekday Alightings	Route Details
7	160	158	El Cerrito del Norte BART to Downtown Berkeley via Arlington Ave. and Shattuck Ave.
18	1,430	1,391	University Village, Albany, to Lake Merritt BART via Solano Ave., Shattuck Ave., Children's Hospital, Martin Luther King Jr. Way, Downtown Oakland and 7th / 8th streets.
29	362	395	Emeryville Public Market to Lakeshore Ave. & Wala Vista Ave., Oakland, via 65th St., Hollis St., Peralta St., West Oakland BART, 10th St., 11th/12th streets, and Lakeshore Ave.
51B	1,163	1,051	Rockridge BART to Berkeley Amtrak or Berkeley Marina via College Ave, Bancroft Way / Durant Ave, Shattuck Ave, Berkeley BART, and University Ave.

TABLE 3-6: WEEKDAY BOARDINGS BY ROUTE WITHIN STUDY AREA			
Route	Total Weekday Boardings	Total Weekday Alightings	Route Details
52	621	647	University Village to UC campus via University Village, Cedar St., Sacramento St., and University Ave., looping the UC campus via Hearst Ave., Gayley St., Bancroft Way, and Shattuck Ave. (Downtown Berkeley).
70	191	208	Richmond BART to Richmond Pkwy. Transit Center via 18th St., Rheem Ave., Doctor's Medical Center, San Pablo Dam Rd., Appian Way and Fitzgerald Dr.
72	**4,028**	**4,018**	Hilltop Mall to Jack London Square via Moyers Rd., Contra Costa College, San Pablo Ave., El Cerrito del Norte BART, and downtown Oakland.
72M	**2,876**	**2,819**	Point Richmond to Jack London Square via Garrard Blvd., Macdonald Ave., El Cerrito del Norte BART, San Pablo Ave. and downtown Oakland
72R	**5,891**	**5,791**	Contra Costa College to Jack London Square via El Cerrito del Norte BART, San Pablo Ave. and downtown Oakland.
74	420	390	Marina Bay, Richmond to Castro Ranch Rd. & San Pablo Dam Rd., El Sobrante, via Richmond BART, 23rd St., Contra Costa College and San Pablo Dam Rd. Weekends, some trips travel from Contra Costa College to Hilltop Mall.
76	1,302	1,158	El Cerrito del Norte BART to Hilltop Mall via Cutting Blvd., Richmond BART, North Richmond, Market St., Church Lane, Road 20, Contra Costa College, Birmingham Dr. and Shane Rd.
80	257	252	El Cerrito Plaza BART to Ashby Ave. & Claremont Ave. via Central Ave, Pierce St., Pacific East Mall, University Village, 6th St., Berkeley Amtrak, 7th St., and Ashby Ave.

TABLE 3-6: WEEKDAY BOARDINGS BY ROUTE WITHIN STUDY AREA			
Route	Total Weekday Boardings	Total Weekday Alightings	Route Details
81	93	77	Berkeley Marina to Ashby Ave. & Claremont Ave. via University Ave., Berkeley Amtrak, 7th St., and Ashby Ave.
88	968	995	From Downtown Berkeley to Lake Merritt BART via University Ave., Sacramento St., Market St. and downtown Oakland.
376	140	81	El Cerrito Del Norte BART to Pinole Vista via Cutting Blvd., Richmond BART, North Richmond, Contra Costa College, Parchester Village, and Richmond Pkwy. Return via Richmond Parkway Transit Center and Hilltop Mall.
667	24	34	Market St. & 6th St., North Richmond to El Cerrito High School and Korematsu Middle School via Market St., Fred Jackson Way, 7th St., Macdonald Ave. and San Pablo Ave.
668	51	49	Richmond BART to El Cerrito High School and Portola Middle School via Harbour Way, Cutting Blvd. and San Pablo Ave.
800	119	172	Richmond BART to Market St. & Van Ness Ave., S.F. (Weekends: 24th St. BART), via San Pablo Ave., University Ave., Telegraph Ave. and downtown Oakland. Returns via Market St., the Transbay Temp. Terminal, and West Oakland BART.
802	104	103	Berkeley Amtrak to downtown Oakland via San Pablo Ave.
G	162	110	Richmond St. & Potrero St., El Cerrito to Transbay Temporary Terminal, San Francisco via Colusa Ave., Solano Ave. and San Pablo Ave.

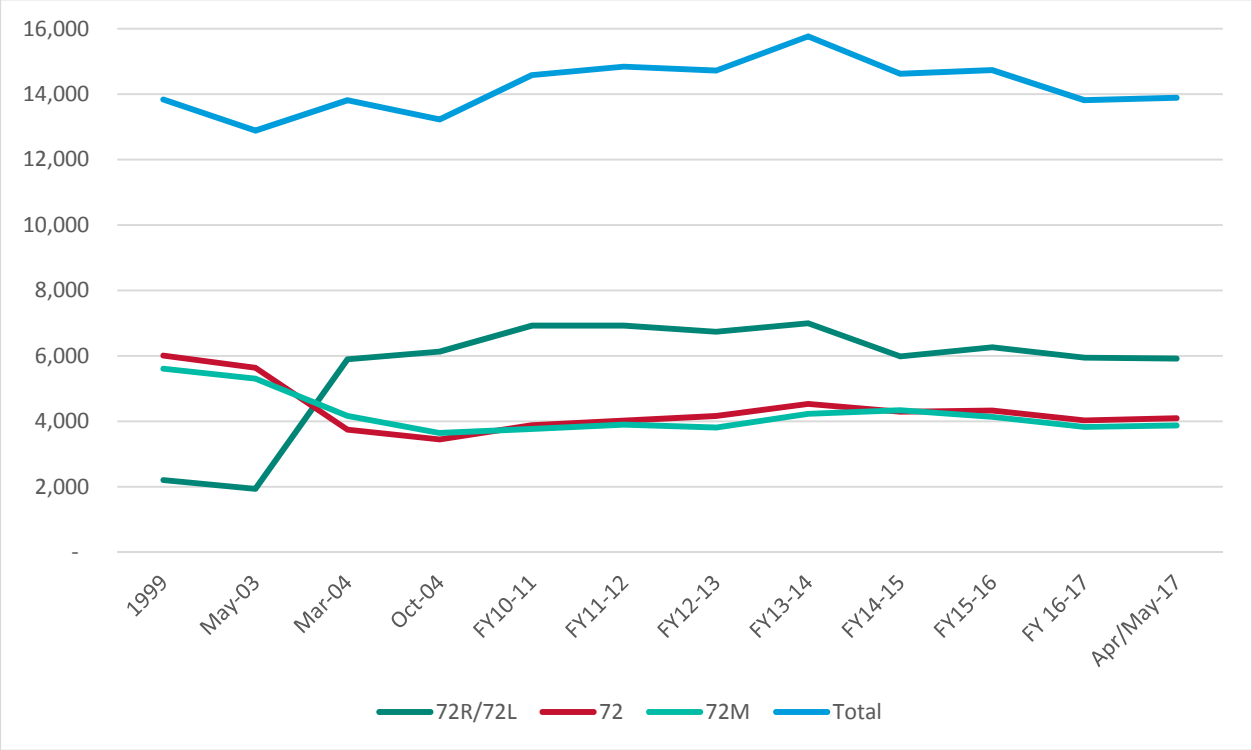
TABLE 3-6: WEEKDAY BOARDINGS BY ROUTE WITHIN STUDY AREA			
Route	Total Weekday Boardings	Total Weekday Alightings	Route Details
H	64	108	Barrett Ave. & San Pablo Ave., El Cerrito, to Transbay Temporary Terminal, San Francisco via Arlington Ave., Monterey Ave. and Gilman St.
L	**288**	**382**	San Pablo Dam Rd. & Princeton Plaza Shopping Center to Transbay Temporary Terminal, San Francisco via El Portal Dr., Rollingwood Dr., San Pablo Ave. and Pierce St.
LA	77	92	Hilltop Dr. Park & Ride to San Francisco via Hilltop Drive, Richmond Parkway and Richmond Parkway Transit Center. Some trips start from Hilltop Green Park.
LC	0	45	Transbay Temporary Terminal, San Francisco to Hilltop Dr. Park & Ride via I-80, Pierce St., San Pablo Ave., El Portal Dr., I-80, Richmond Pkwy. and Hilltop Dr. From San Francisco only; travel to San Francisco via line L or LA.
Z	20	20	Transbay Temporary Terminal, San Francisco to San Pablo Ave.& Marin Ave., Albany via Christie St., Hollis St. and Sixth St. (Continues to Buchanan St. & Pierce St. in mornings.)

Source: AC Transit

Note: Rows in **bold** represent the highest ridership routes by type of service. Table only refers to weekly boardings and alightings in the study area.

Historical ridership data for the highest ridership routes in the corridor – Routes 72, 72M, and 72R – is shown in **Graph 3-2**. Ridership on these routes has remained steady since a service change in June 2003, when the Route 72R was introduced. Its predecessor, Route 72L, had more closely spaced stops. The reduction of the number of stops on Route 72R resulted in a subsequent increase in ridership on that route, alongside a decrease in ridership on Routes 72 and 72M. Since the service change, average weekday ridership on the 72 routes has ranged from 13,000 to 16,000 total daily boardings.

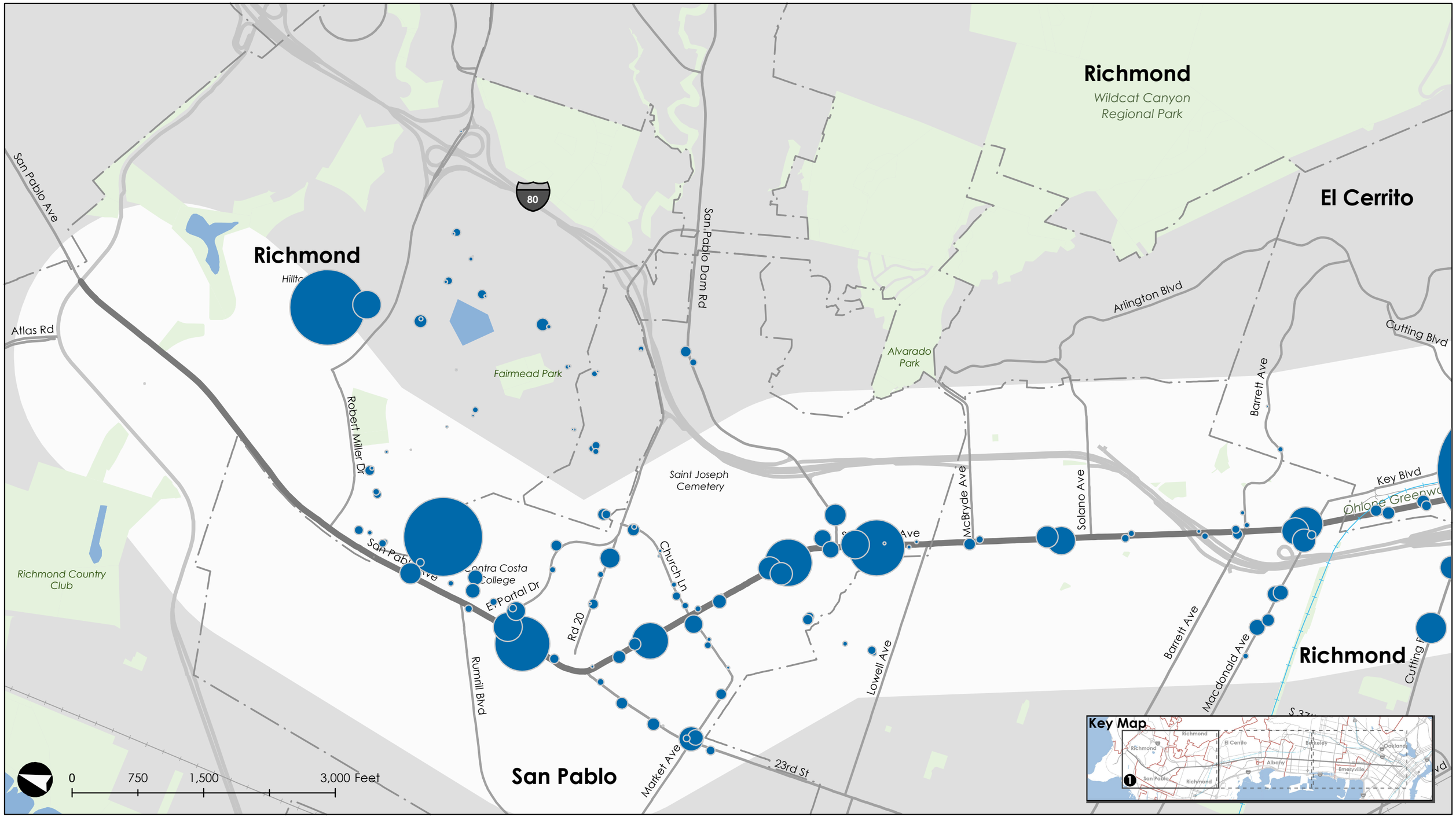
Graph 3-2. Historical Average Weekday Ridership for Routes 72, 72M, 72R



Source: AC Transit

Figure 3-2 displays AC Transit average ridership data by bus stop during the weekday PM peak period (April and May 2017 data). **Appendix B** includes average ridership figures for the weekday AM and midday peak periods.

Graph 3-3 and **Figure 3-3** summarize the peak period boardings at the top ten highest daily ridership bus stops based on weekday AC Transit ridership on San Pablo Avenue. As shown, the El Cerrito del Norte BART Station has the highest bus ridership in the Study Area with an average of 1,478 daily weekday bus boardings and 1,772 daily weekday bus alightings (AC Transit ridership only).



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space
- Low Ridership (1) (min)
- High Ridership (389) (max)

Note: Data shown for AC Transit routes operating within project corridor only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

Figure 3-2.1: Existing Bus Ridership, Weekday PM Peak Period
San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard

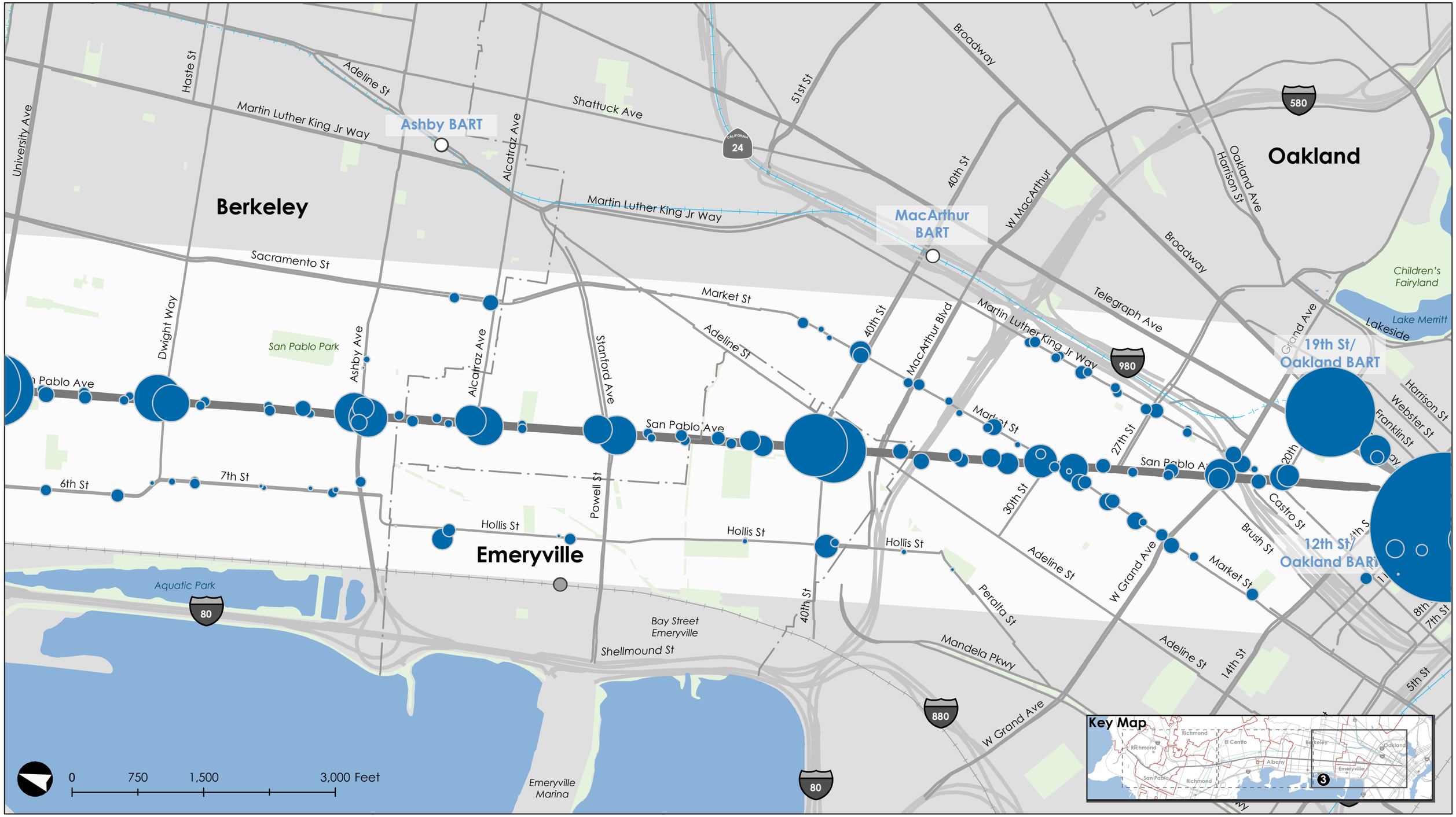
Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space
- Low Ridership (1) (min)
- High Ridership (389) (max)

Note: Data shown for AC Transit routes operating within project corridor only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

ALAMEDA County Transportation Commission

Figure 3-2.2: Existing Bus Ridership, Weekday PM Peak Period
San Pablo Corridor between Cutting Boulevard and University Avenue



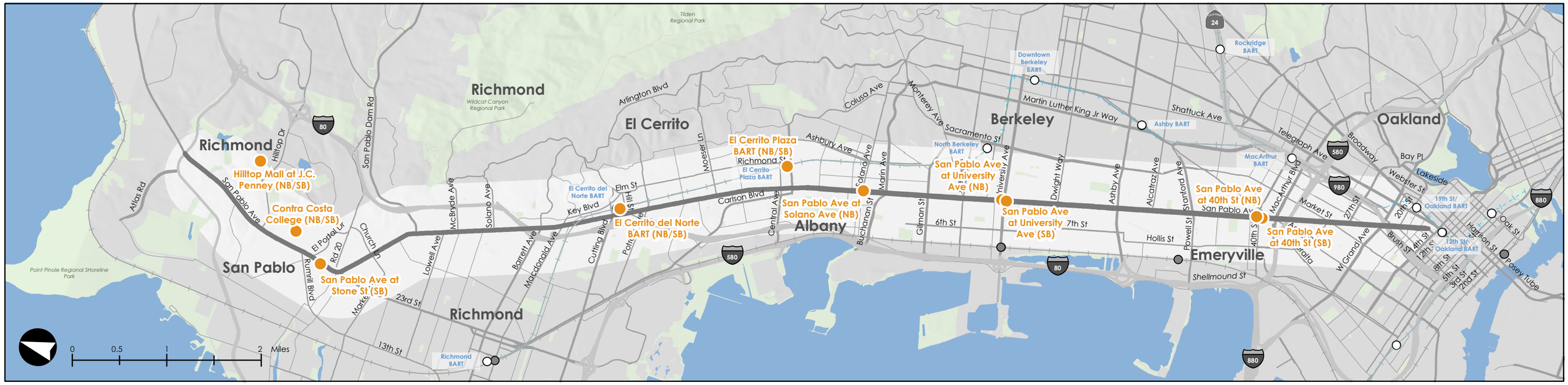
Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space
- Low Ridership (1) (min)
- High Ridership (389) (max)

Note: Data shown for AC Transit routes operating within project corridor only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

San Pablo Avenue Corridor Project

Figure 3-2.3: Existing Bus Ridership, Weekday PM Peak Period
San Pablo Corridor between University Avenue and Frank Ogawa Plaza



San Pablo Avenue Corridor Project

Legend:

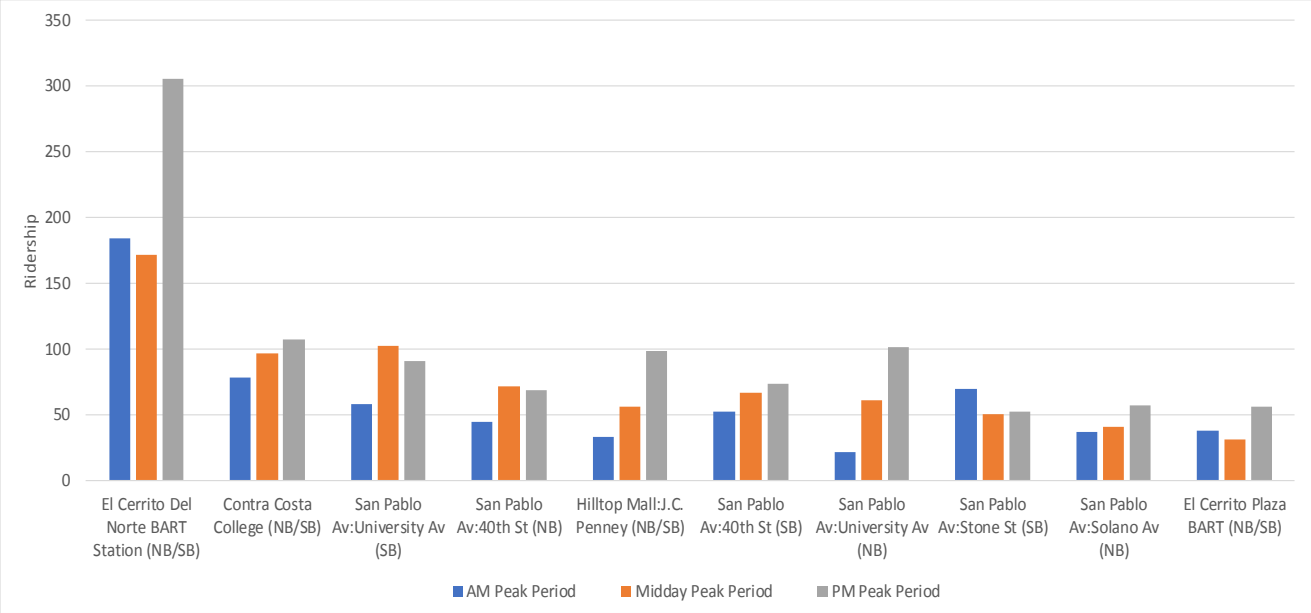
- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Freeways
- Water
- Parks/Open Space
- Top 10 Average Weekday Peak Period Ridership Stop

Source: AC Transit

ALAMEDA County Transportation Commission

Figure 3-3: Top 10 Average Weekday Peak Period Ridership Stops

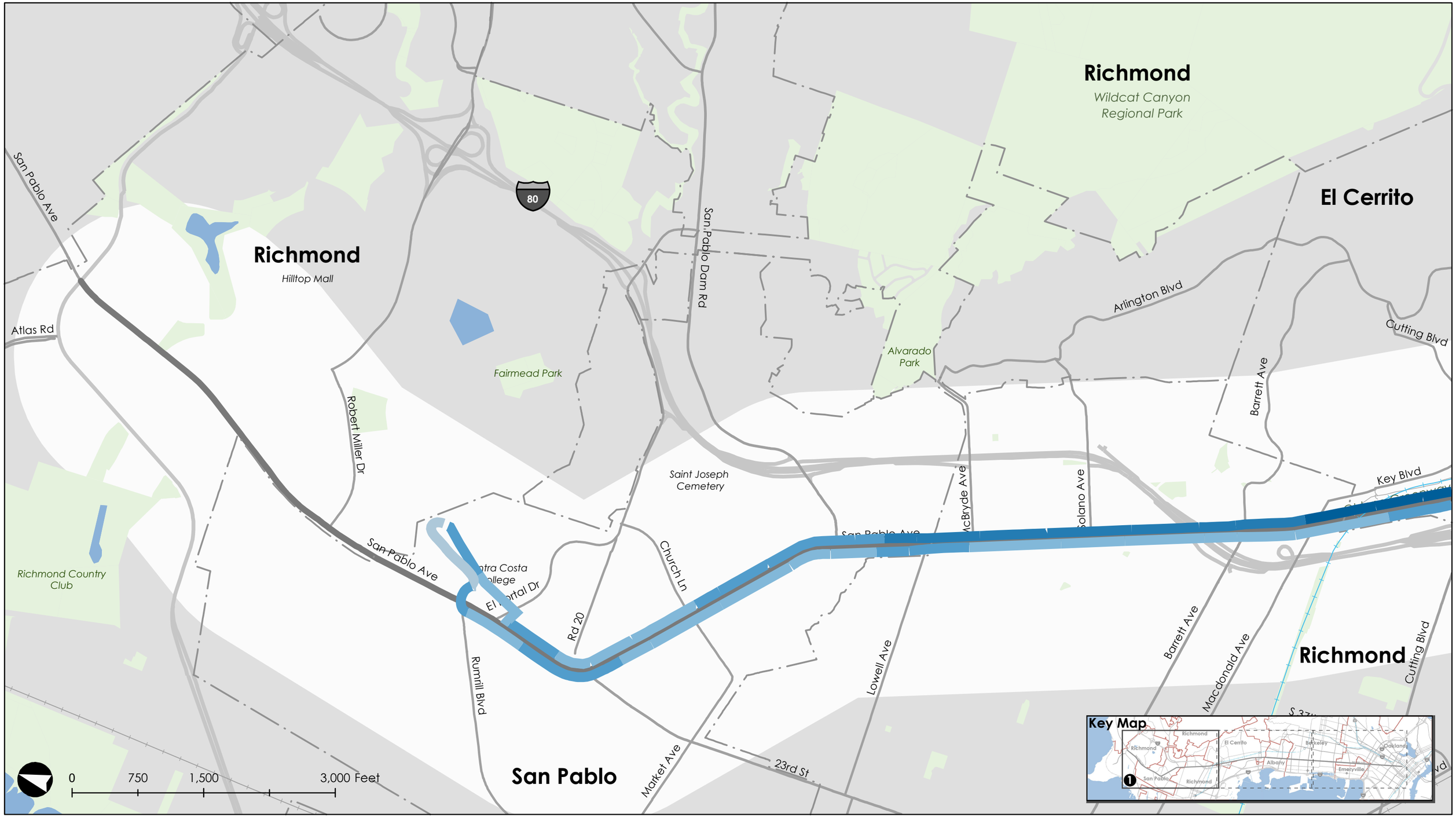
Graph 3-3. San Pablo Avenue Average Weekday Peak Period Boardings at Highest Ridership Stops



Source: AC Transit

Figure 3-4 displays the average load by segment for the weekday PM peak period. This depicts the number of transit passengers across all AC Transit routes operating on San Pablo Avenue. **Graph 3-4** and **Graph 3-5** show the northbound and southbound total average load for all routes that serve bus stops along San Pablo Avenue. The total average load reflects the cumulative load across all AC Transit routes, including Local, Transbay, Rapid, and School.

As shown, buses operating along San Pablo Avenue experience greater loads during the weekday PM peak period in the northbound direction and greater loads during the weekday AM peak period in the southbound direction. The load graphs show directional commute patterns in both the northbound and southbound directions, reflected by rising ridership loads in the PM peak period traveling northbound and in the AM peak period traveling southbound. Additionally, in both the northbound and southbound directions, the cumulative load notably changes south of University Avenue.



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Total Transit Load

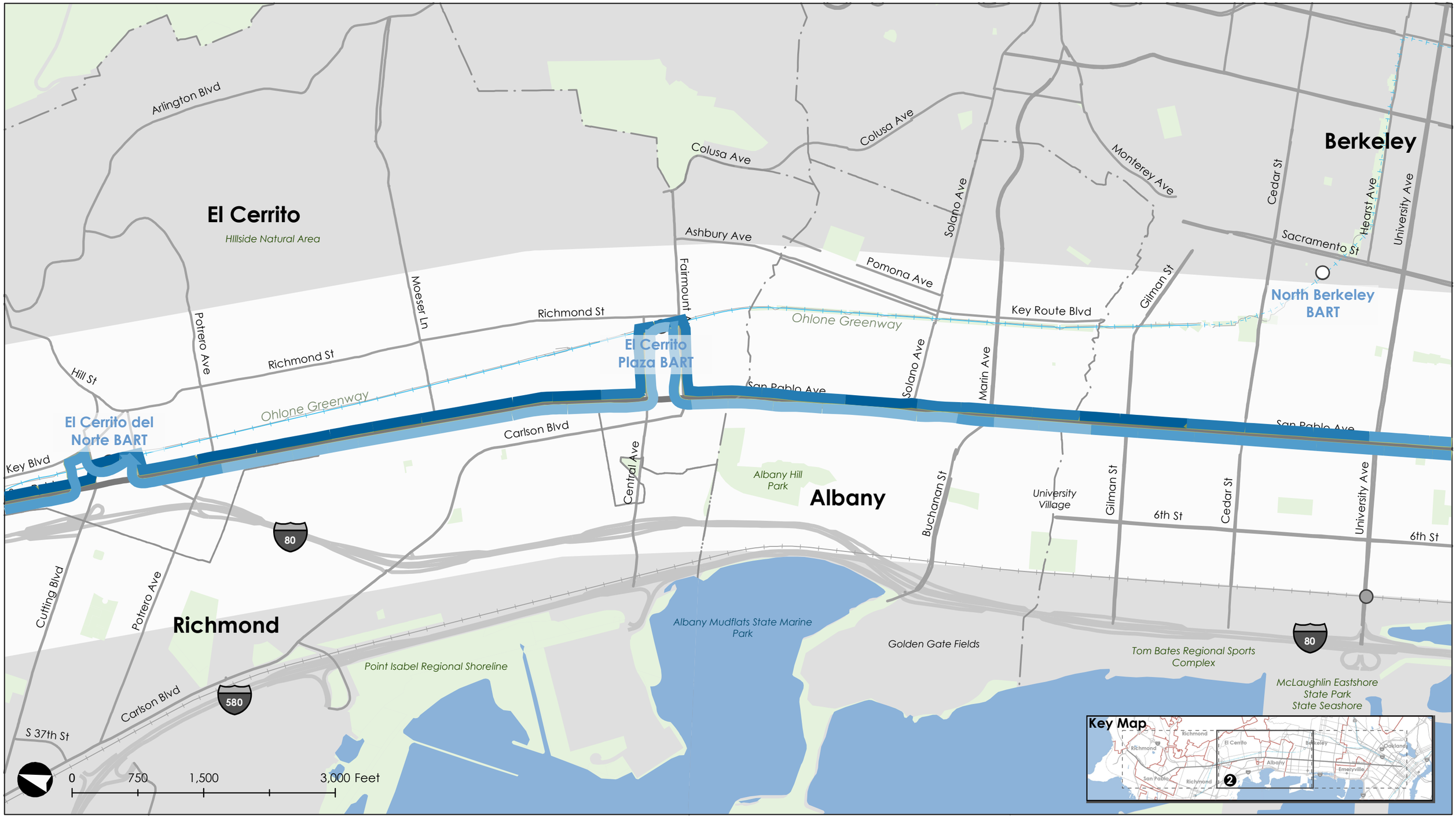
- 0 to 125 riders
- 325 to 425 riders
- 625 to 725 riders

Note: Load reflects the total average load for all routes that serve bus stops along San Pablo Ave. Data shown for AC Transit routes on San Pablo Ave. only. PM Peak Period 4:00PM to 6:00PM.

Source: AC Transit.

San Pablo Avenue Corridor Project

Figure 3-4.1: Existing Bus Load, Weekday PM Peak Period
San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Total Transit Load

- 0 to 125 riders
- 325 to 425 riders
- 625 to 725 riders

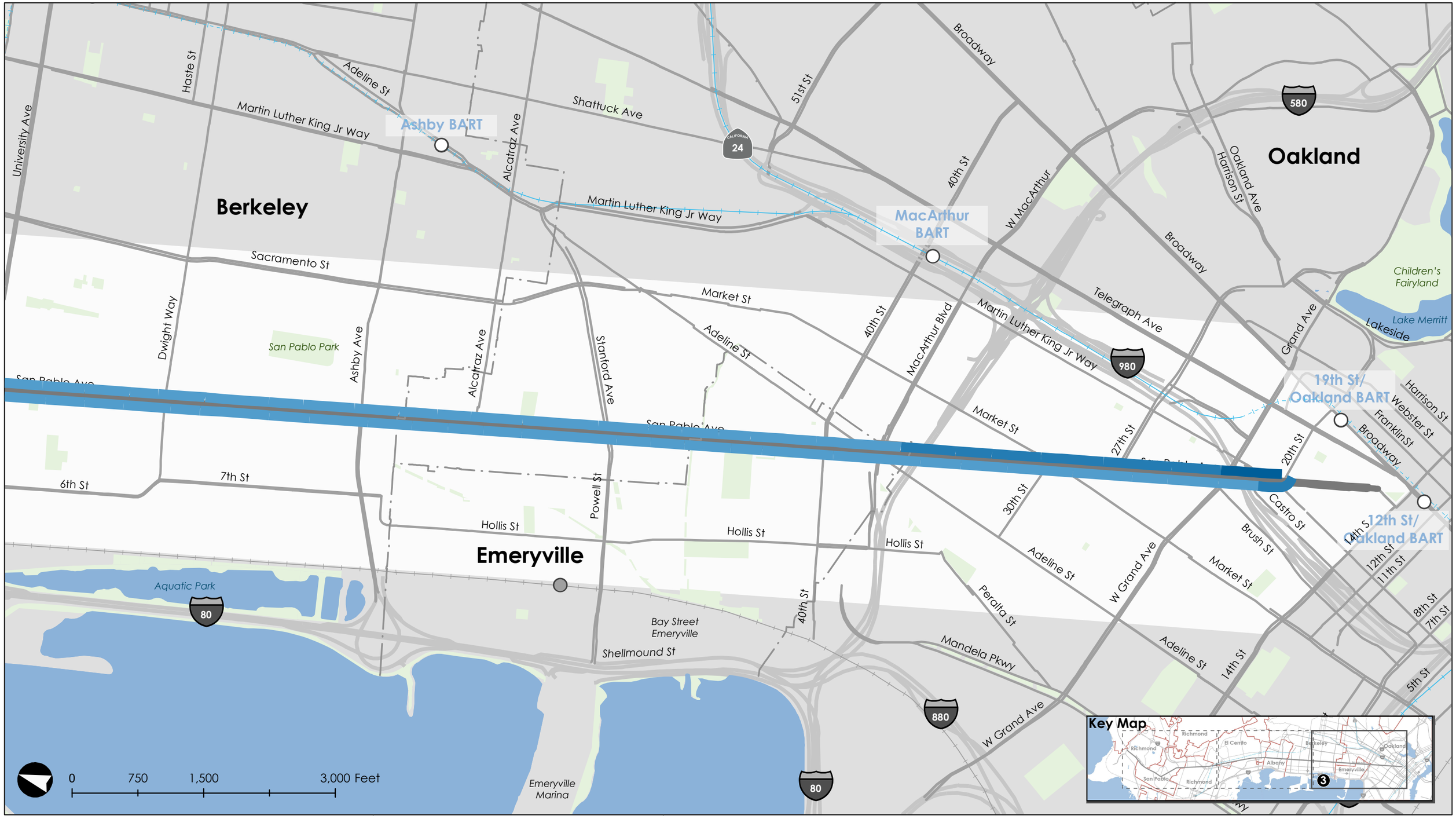
Note: Load reflects the total average load for all routes that serve bus stops along San Pablo Ave. Data shown for AC Transit routes on San Pablo Ave. only. PM Peak Period 4:00PM to 6:00PM.

Source: AC Transit.

ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 3-4.2: Existing Bus Load, Weekday PM Peak Period
San Pablo Corridor between Cutting Boulevard and University Avenue



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Total Transit Load

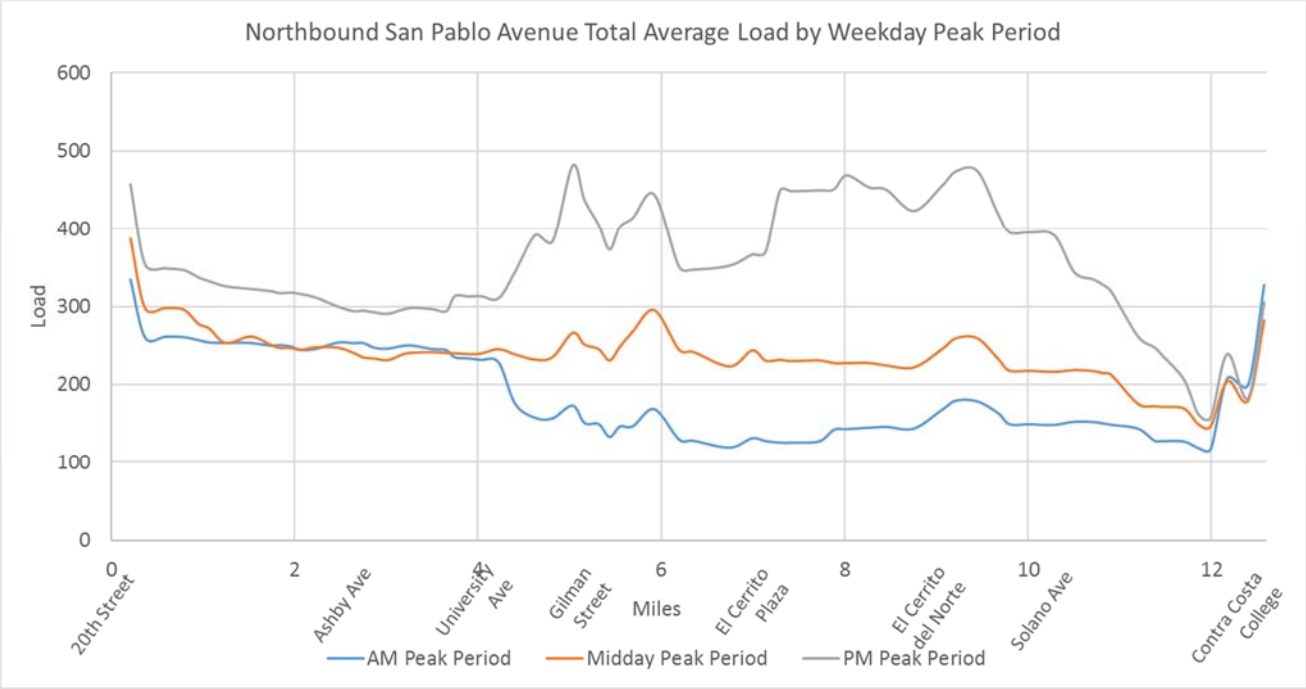
- 0 to 125 riders
- 325 to 425 riders
- 625 to 725 riders

Note: Load reflects the total average load for all routes that serve bus stops along San Pablo Ave. Data shown for AC Transit routes on San Pablo Ave. only. PM Peak Period 4:00PM to 6:00PM.

Source: AC Transit.

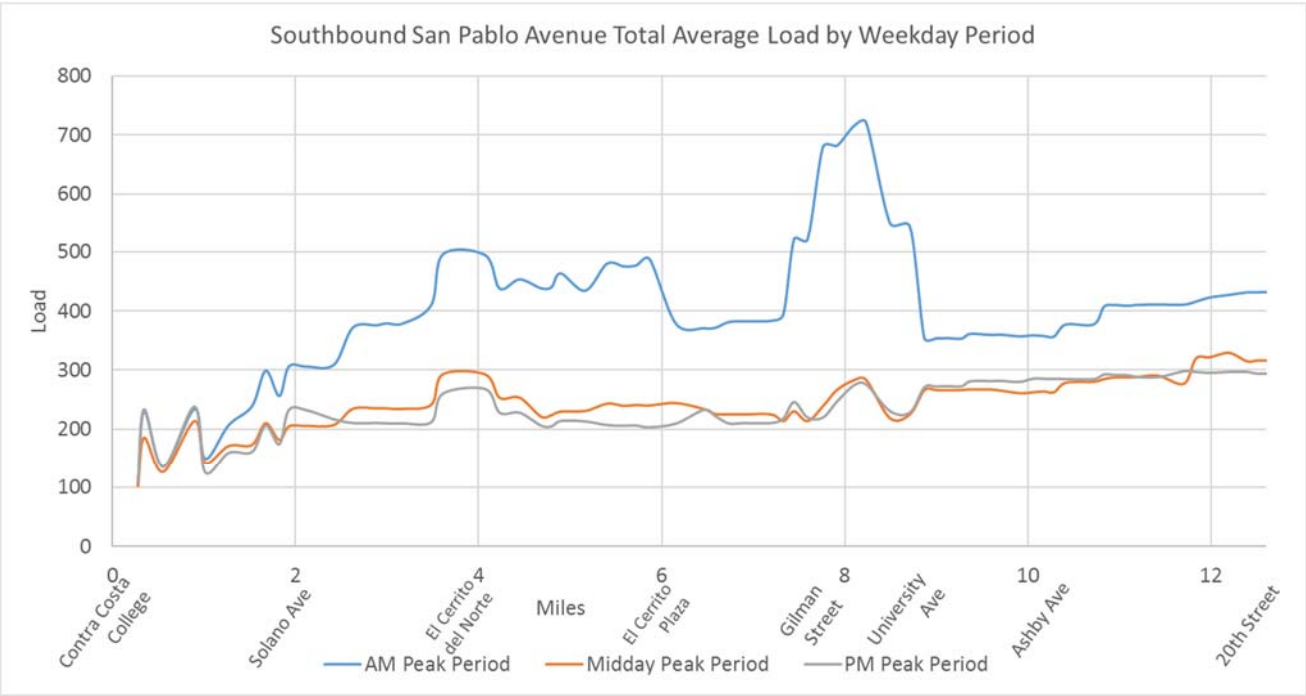
Figure 3-4.3: Existing Bus Load, Weekday PM Peak Period
San Pablo Corridor between University Avenue and Frank Ogawa Plaza

Graph 3-4. Northbound San Pablo Avenue Total Average Load by Weekday Peak Period



Source: AC Transit

Graph 3-5. Southbound San Pablo Avenue Total Average Load by Weekday Period



Source: AC Transit

Below is a summary of the highest total average load by direction and weekday peak period:

- AM Peak Period
  - The highest northbound load point is located between 20th Street and Grand Avenue (Oakland), with an average total weekday load of 335.
  - The highest southbound load point is located between Page and Cedar Street (Berkeley), where Lines 72/72M/72R overlap with Line 52, with a total load of 722 passengers.
- Midday Peak Period
  - The highest northbound load point is between 20th Street and Grand Avenue (Oakland), with an average weekday load of 387 passengers.
  - The highest southbound load point is between Castro Street and 20th Street (Oakland), with a load of 394 passengers.
- PM Peak Period
  - The highest northbound load point is between Page Street and Gilman Street (Berkeley), just south of El Cerrito Plaza BART, with an average weekday load of 481 passengers.
  - The highest southbound load point is between Castro Street and 20th Street (Oakland), with a load of 404 passengers.

3.2.2 BART

Table 3-7 summarizes the number of average weekday entries and exits at the 12th Street, 19th Street, El Cerrito Plaza, and El Cerrito del Norte BART stations. As shown, the 12th Street and 19th Street stations each serve approximately the same number of passengers and serve approximately 2.6 times the number of passengers at the El Cerrito Plaza station and approximately 1.5 times the passengers at the El Cerrito del Norte station. The El Cerrito del Norte station serves almost double the passengers as the El Cerrito Plaza station.

TABLE 3-7: BART STATION WEEKDAY RIDERSHIP

BART Station	Weekday Entries	Weekday Exits	Weekday Entries Rank[1]	Weekday Exits Rank[1]
12th Street/Oakland	13,414	13,701	6/46	5/46
19th Street/Oakland	13,452	13,431	5/46	6/46
El Cerrito Plaza	4,970	5,075	31/46	31/46
El Cerrito del Norte	8,656	9,010	13/46	13/46

Source: BART September 2017 station-level ridership data

[1] Reflects rank of each BART Station in the Study Area relative to all stations in the BART system.

3.3 TRANSIT TRAVEL TIME, SPEED AND VARIABILITY

In order to assess bus travel time, speeds and variability along San Pablo Avenue, an Automatic Vehicle Location (AVL) dataset was obtained from AC Transit for the months of April and May of 2017. The dataset includes records of bus stop arrival/departure times and dwell times. Transit data was assessed for the weekday AM, midday, and PM peak periods. Travel time, speed, and variability were analyzed for Rapid (Line 72R) and Local service along San Pablo Avenue. For purposes of this analysis, the Local service includes Local, Transbay, and School routes that travel and serve stops along San Pablo Avenue. School routes are only factored in the AM peak period analysis; the after-school peak was not studied.

Table 3-8 and **Table 3-9** depict average bus travel times and speeds between San Pablo/20th Street and Contra Costa College for Local and Rapid routes, respectively. The directional San Pablo Avenue travel time was estimated by summing average travel time for each segment, including dwell time occurring at intermediate stops. In both directions, travel times increase throughout the day, with the PM peak period exhibiting the longest travel times in both directions.

TABLE 3-8: AVERAGE TOTAL TRAVEL TIME AND SPEED - LOCAL SERVICE

Direction	AM Peak		Midday Peak		PM Peak	
	Travel Time (hr:min)	Average Speed (mph)	Travel Time (hr:min)	Average Speed (mph)	Travel Time (hr:min)	Average Speed (mph)
Northbound	1:01	12.4	1:13	10.4	**1:27**	**8.7**
Southbound	**1:14**	**10.4**	1:16	10.2	1:20	9.7

Note: The numbers in bold reflect the highest ridership peak period by direction (i.e., AM peak period in the southbound direction and PM peak period in the northbound direction).

TABLE 3-9: AVERAGE TOTAL TRAVEL TIME AND SPEED – RAPID SERVICE (LINE 72R)

Direction	AM Peak		Midday Peak		PM Peak	
	Travel Time (hr:min)	Average Speed (mph)	Travel Time (hr:min)	Average Speed (mph)	Travel Time (hr:min)	Average Speed (mph)
Northbound	0:49	14.6	0:55	12.9	**1:11**	**10.0**
Southbound	**1:00**	**12.3**	0:59	12.4	1:05	11.2

Note: The numbers in bold reflect the highest ridership peak period by direction (i.e., AM peak period in the southbound direction and PM peak period in the northbound direction).

Figure 3-5 depicts the speeds by segment for Local and Rapid routes during the weekday PM peak period. The average speed of local routes ranges from 8.7 to 12.4 mph, while the average speed of the Rapid route ranges from 10.0 to 14.6 mph. For local routes and the Rapid route, the PM peak period exhibited the longest travel times and lowest average speeds in both northbound and southbound directions. **Graph 3-6** through **Graph 3-9** illustrate the directional average speed by segment along San Pablo Avenue by time period, for Local and Rapid service respectively. Appendix B includes figures showing the average segment speeds during the AM peak and midday peak periods.

In the northbound direction, for both the Local and Rapid services, the AM peak period experiences higher speeds and the PM peak period experiences lower speeds. The Local service has low speeds, close to five mph during AM, midday, and PM peak periods near the Gilman Street intersection and the El Cerrito del Norte BART station. The Rapid service has less variation in speed than the Local service along San Pablo Avenue. Based on the analysis, the following are areas that experience notably degraded speeds northbound on San Pablo Avenue:

- Road 20
- San Pablo Dam Road
- El Cerrito del Norte BART
- El Cerrito Plaza BART
- Buchanan Street
- Ashby Avenue
- MacArthur Boulevard

In the southbound direction, the Local and Rapid services both experience a drop in speed around the El Cerrito del Norte BART station. The AM, midday, and PM peak periods all have similar speed variations along San Pablo Avenue, with the PM peak period having slightly slower speeds and the midday peak period slightly higher speeds. The following are areas that experience notably degraded speeds southbound on San Pablo Avenue:

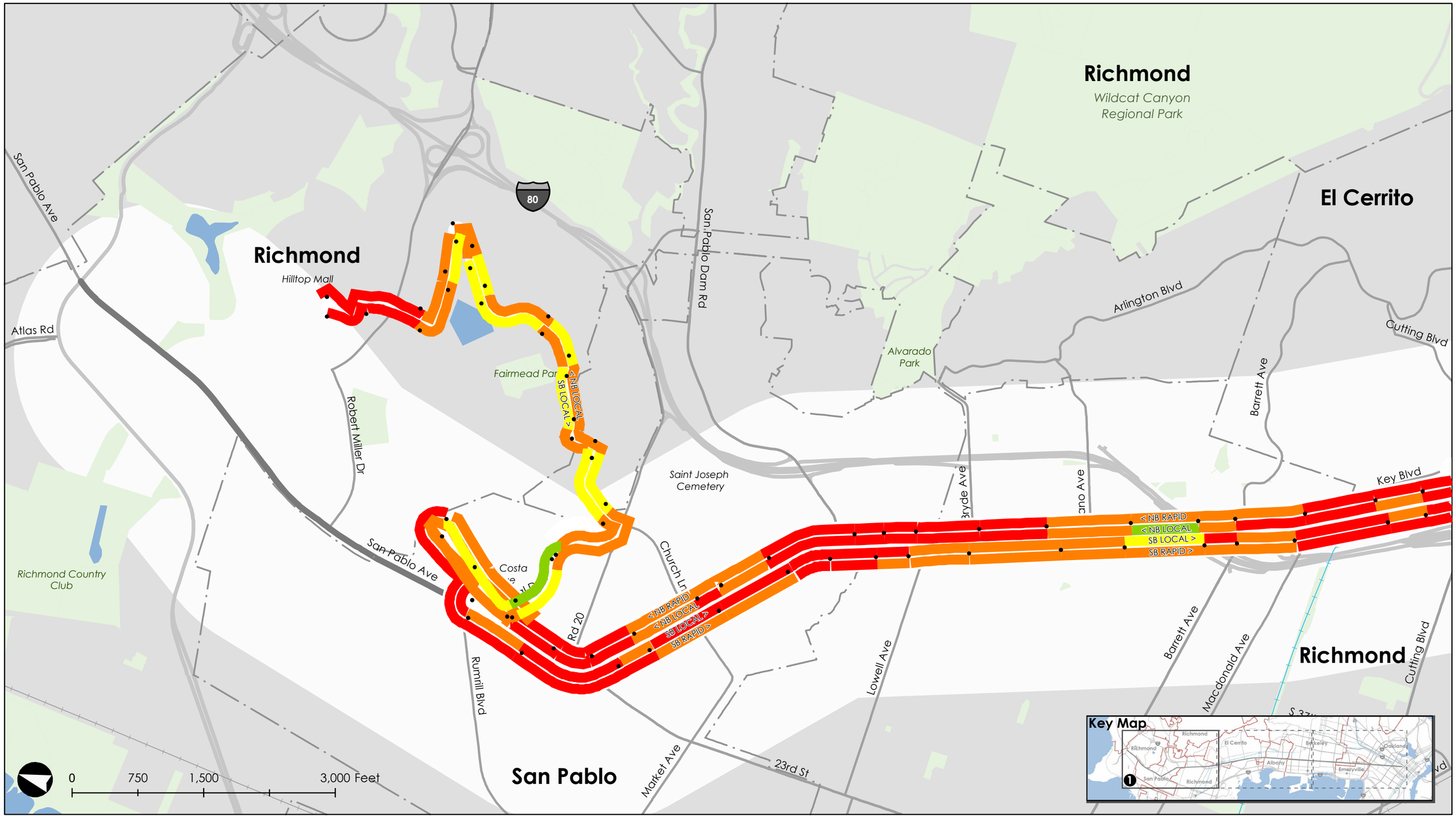
- 40th Street
- Gilman Street
- El Cerrito del Norte BART
- Macdonald Avenue
- Road 20

In addition to speed and travel time, transit variability was also estimated to determine variability of bus travel time along identified segments on San Pablo Avenue. Transit variability is the standard deviation of travel time for a segment divided by the average travel time of that segment.

Figure 3-6 depicts the variability of Local (i.e., Local, Transbay, and School routes) and Rapid (72R) routes. For Local routes, the segments with the poorest variability are between Gilman Street and El Cerrito Plaza BART station in both the northbound and southbound directions during all three peak periods. The segments with the poorest variability for the Rapid route is between Macdonald Avenue and El Cerrito del Norte BART station in the southbound direction during the PM peak period. Stops are a source of travel time variability; as such, the limited stops served by the Rapid route result in generally more reliable travel time for the Rapid route. **Graph 3-10** through **Graph 3-13** illustrate the directional travel time variability by segment along San Pablo Avenue by time period, for Local and Rapid service respectively. Appendix B includes figures showing the travel time variability by segment during the AM peak and midday peak periods.

In the northbound direction, during all three peak periods, the segment traversing Gilman Street has notably poor travel time variability. In the southbound direction, the Local and Rapid routes both experience notably poor travel time variability around the El Cerrito del Norte station. The Local routes experience poor travel time variability in the southbound direction leading into downtown Oakland.

On-time performance for the local Route 72 and the Rapid Route 72R is 59 percent and 61 percent, respectively (AC Transit, Short Range Transit Plan 2014/15 through 2023/24). This falls well below the agency goal of 72 percent for on-time performance, which is defined as between one minute early and five minutes late.



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Bus Speed (mph)

- 2-10
- 11-15
- 16-20
- 21-25
- 26-30

- Bus Stop
- NB Rapid
- NB Local
- SB Local
- SB Rapid

Note: Data shown for AC Transit routes on San Pablo Ave. only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

San Pablo Avenue Corridor Project

Figure 3-5.1: Existing Bus Speed, PM Peak Hour
San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard

El Cerrito
Hillside Natural Area
Berkeley
Albany
Richmond
Arlington Blvd
Colusa Ave
Ashbury Ave
Pomona Ave
Solano Ave
Monterey Ave
Cedar St
Hearst Ave
University Ave
Sacramento St
Key Route Blvd
Gilman St
Richmond St
Potrero Ave
Moeser Ln
Hill St
Ohlone Greenway
El Cerrito Plaza BART
North Berkeley BART
El Cerrito del Norte BART
< NB RAPID
< NB LOCAL
SB LOCAL >
SB RAPID >
Carlson Blvd
Central Ave
Albany Hill Park
Buchanan St
University Village
6th St
Key Blvd
Cutting Blvd
80
580
Albany Mudflats State Marine Park
Golden Gate Fields
Point Isabel Regional Shoreline
Tom Bates Regional Sports Complex
McLaughlin Eastshore State Park
State Seashore
S 37th St
0
750
1,500
3,000 Feet

Key Map

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Bus Speed (mph)
- 2-10
- 11-15
- 16-20
- 21-25
- 26-30

- Bus Stop
- NB Rapid
- NB Local
- SB Local
- SB Rapid

Note: Data shown for AC Transit routes on San Pablo Ave. only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 3-5.2: Existing Bus Speed, PM Peak Hour
San Pablo Corridor between Cutting Boulevard and University Avenue

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Bus Speed (mph)

- 2-10
- 11-15
- 16-20
- 21-25
- 26-30

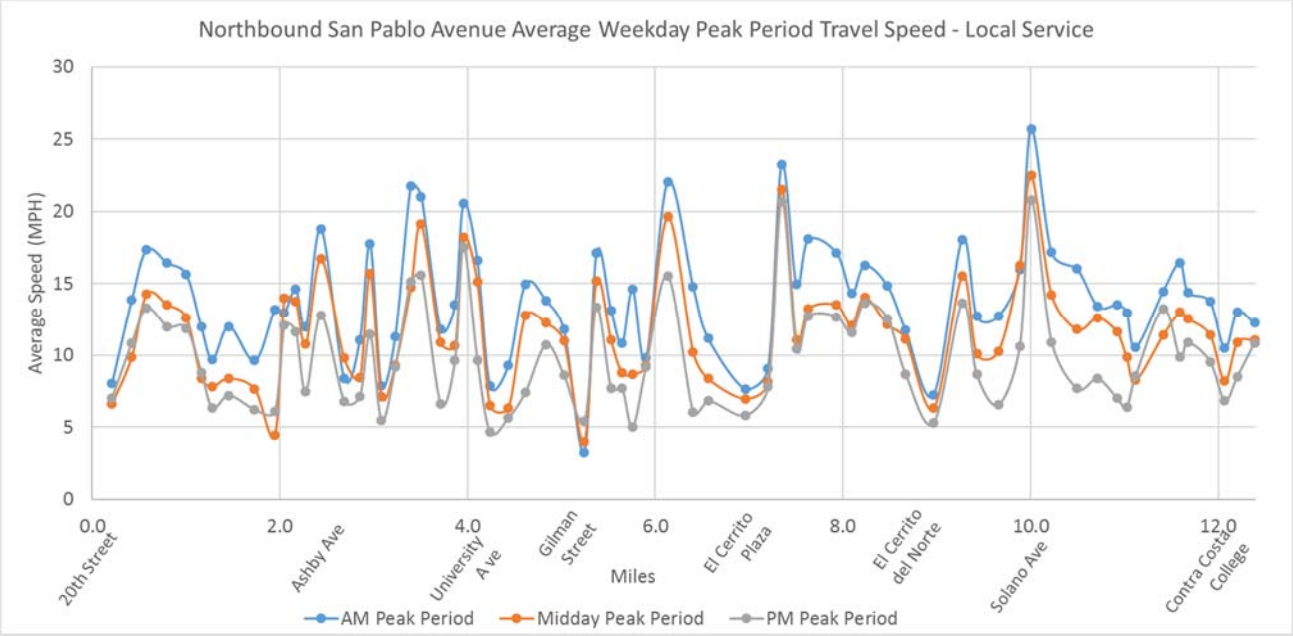
- Bus Stop
- NB Rapid
- NB Local
- SB Local
- SB Rapid

Note: Data shown for AC Transit routes on San Pablo Ave. only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

San Pablo Avenue Corridor Project

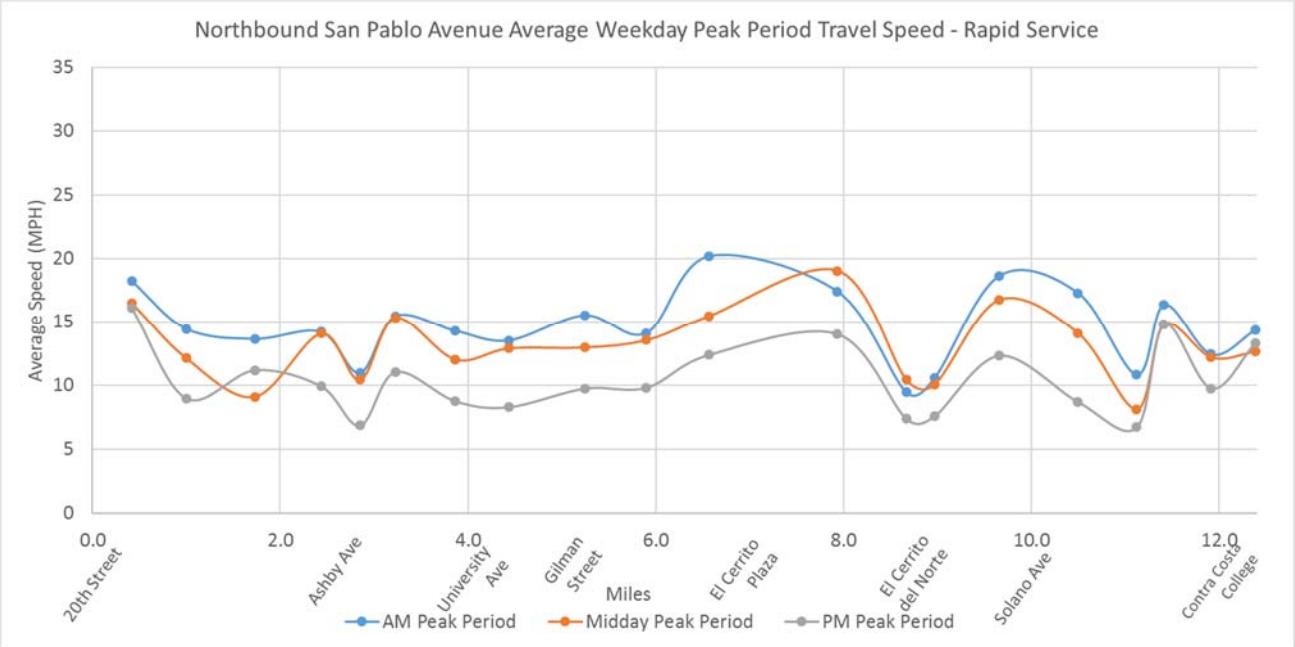
Figure 3-5.3: Existing Bus Speed, PM Peak Hour
San Pablo Corridor between University Avenue and Frank Ogawa Plaza

Graph 3-6. Northbound San Pablo Avenue Average Weekday Peak Period Travel Speed - Local Service



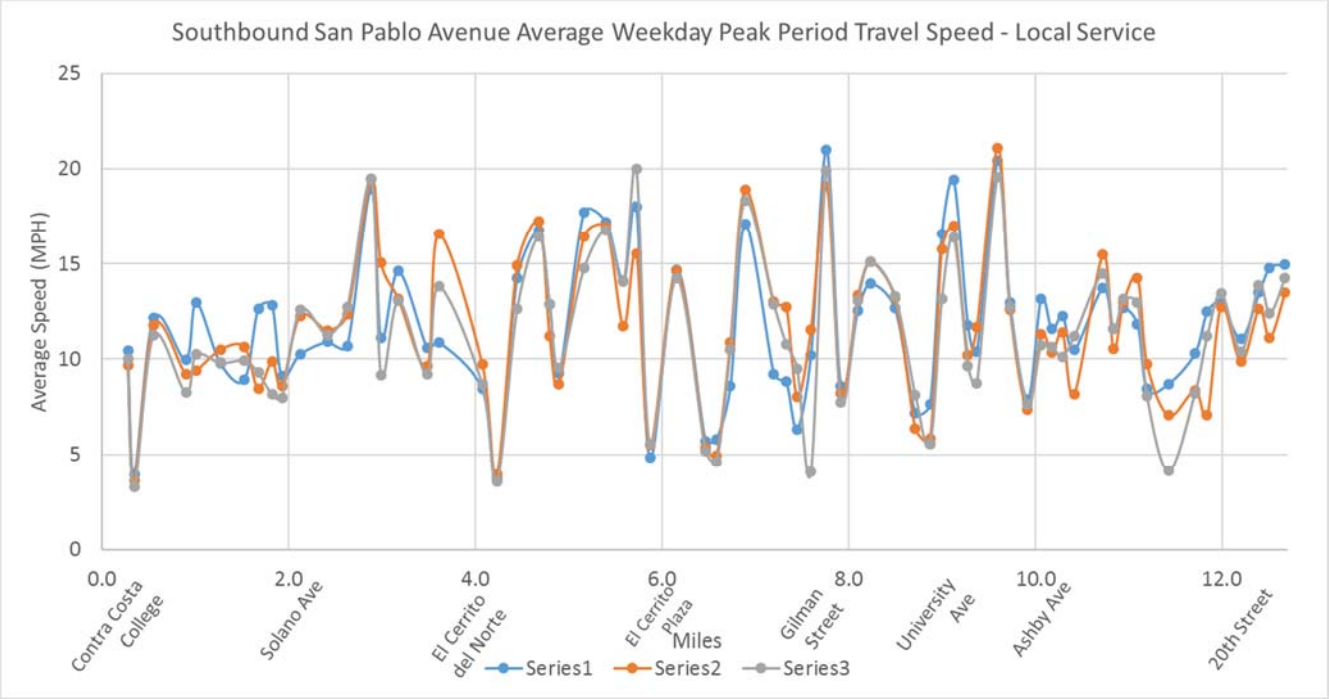
Source: AC Transit, 2017

Graph 3-7. Northbound San Pablo Avenue Average Weekday Peak Period Travel Speed – Rapid Service



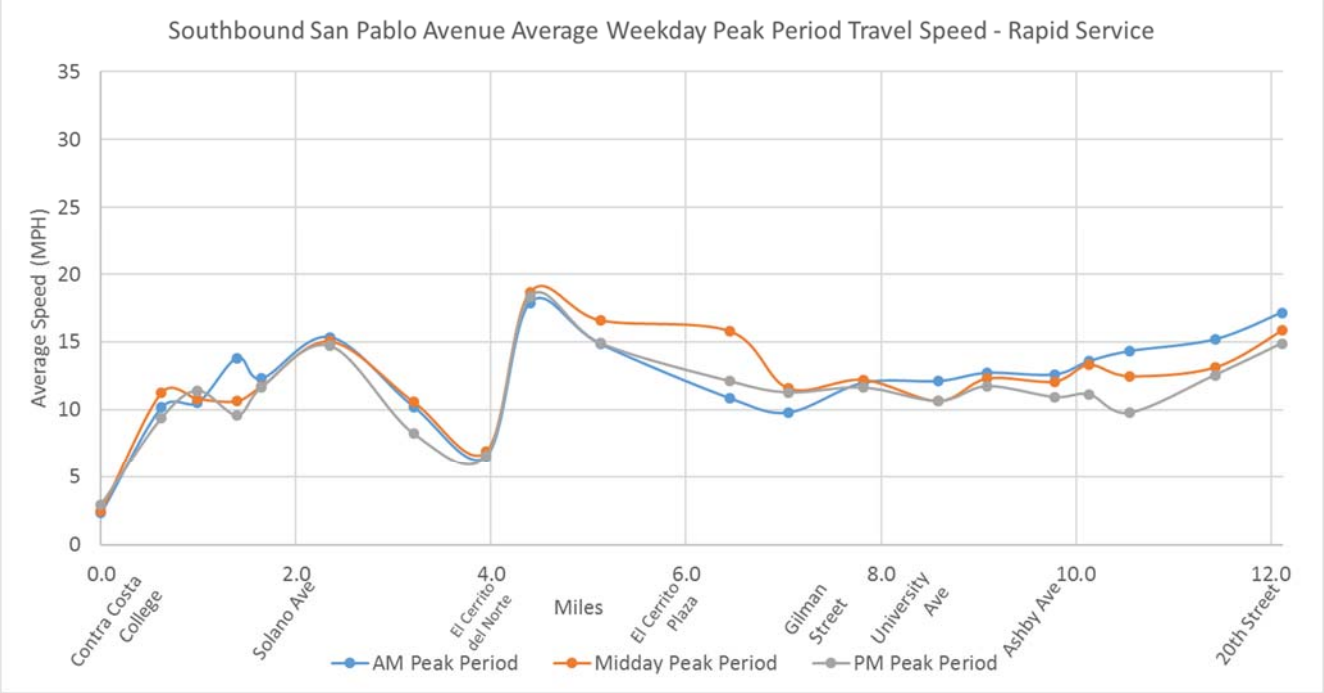
Source: AC Transit, 2017

Graph 3-8. Southbound San Pablo Avenue Average Weekday Peak Period Travel Speed - Local Service

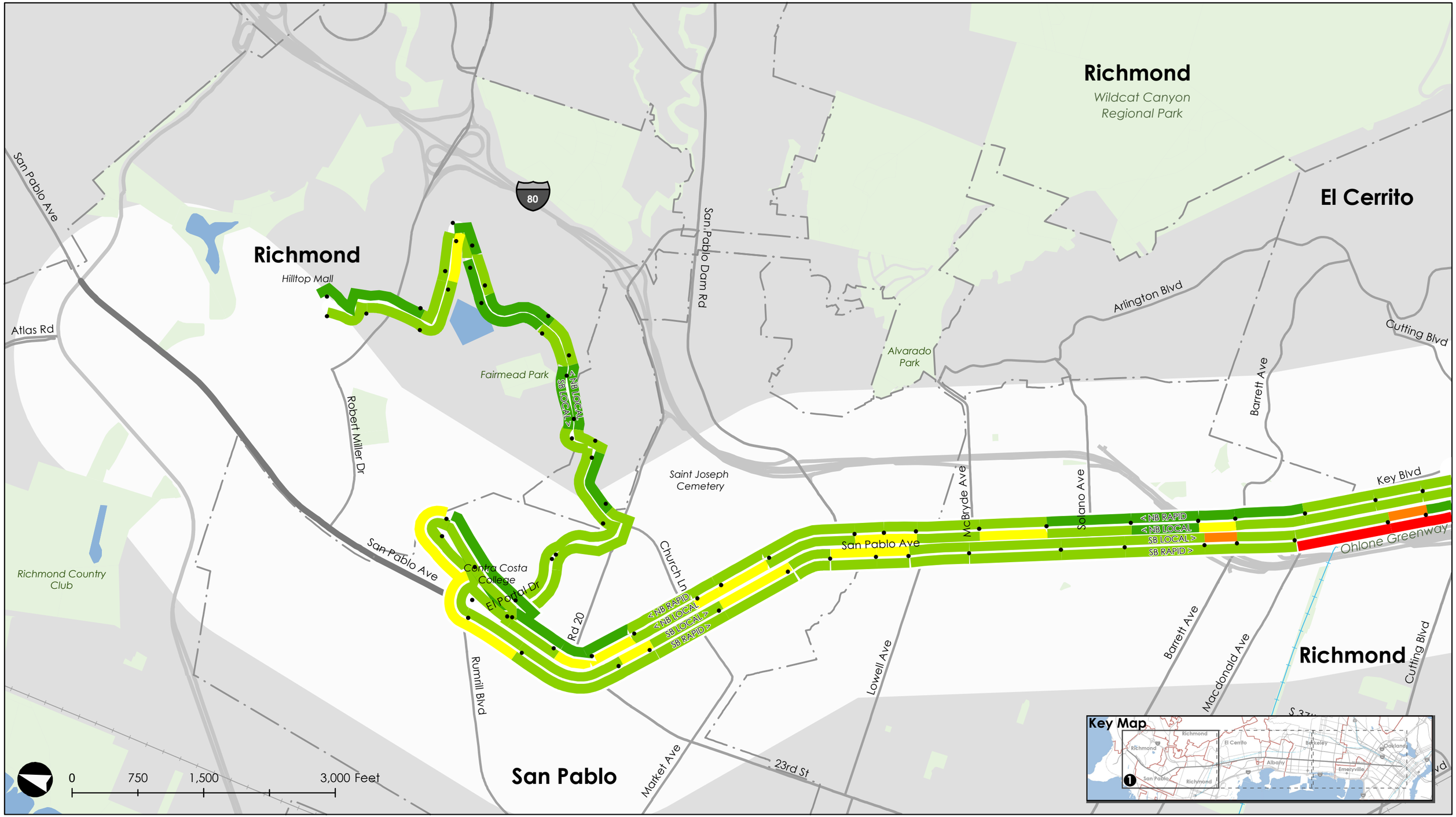


Source: AC Transit, 2017

Graph 3-9. Southbound San Pablo Avenue Average Weekday Peak Period Travel Speed - Rapid Service



Source: AC Transit, 2017



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Bus Variability (mph/mph)

- 0.00 - 0.25 **High**
- 0.25 - 0.50
- 0.50 - 0.75 **Medium**
- 0.75 - 1.00
- 1.00 - 2.00 **Low**

- Bus Stop
- NB Rapid
- NB Local
- SB Local
- SB Rapid

Note: Data shown for AC Transit routes on San Pablo Ave. only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

San Pablo Avenue Corridor Project

Figure 3-6.1 Existing Bus Variability, PM Peak Hour
San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard

El Cerrito
Hillside Natural Area
Berkeley
Albany
Richmond
Arlington Blvd
Colusa Ave
Monterey Ave
Cedar St
Hearst Ave
University Ave
Sacramento St
Ashbury Ave
Pomona Ave
Solano Ave
Fairmount Ave
Moeser Ln
Potrero Ave
Richmond St
Hill St
Key Route Blvd
Gilman St
North Berkeley BART
Ohlone Greenway
El Cerrito Plaza BART
El Cerrito del Norte BART
< NB RAPID
< NB LOCAL
SB LOCAL >
SB RAPID >
San Pablo Ave
Marin Ave
Carlson Blvd
Key Blvd
Central Ave
Albany Hill Park
Buchanan St
University Village
6th St
Cutting Blvd
80
580
Albany Mudflats State Marine Park
Golden Gate Fields
Point Isabel Regional Shoreline
Tom Bates Regional Sports Complex
McLaughlin Eastshore State Park
State Seashore
S 37th St
0
750
1,500
3,000 Feet
Key Map

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Bus Variability (mph/mph)

- 0.00 - 0.25 **High**
- 0.25 - 0.50
- 0.50 - 0.75 **Medium**
- 0.75 - 1.00
- 1.00 - 2.00 **Low**

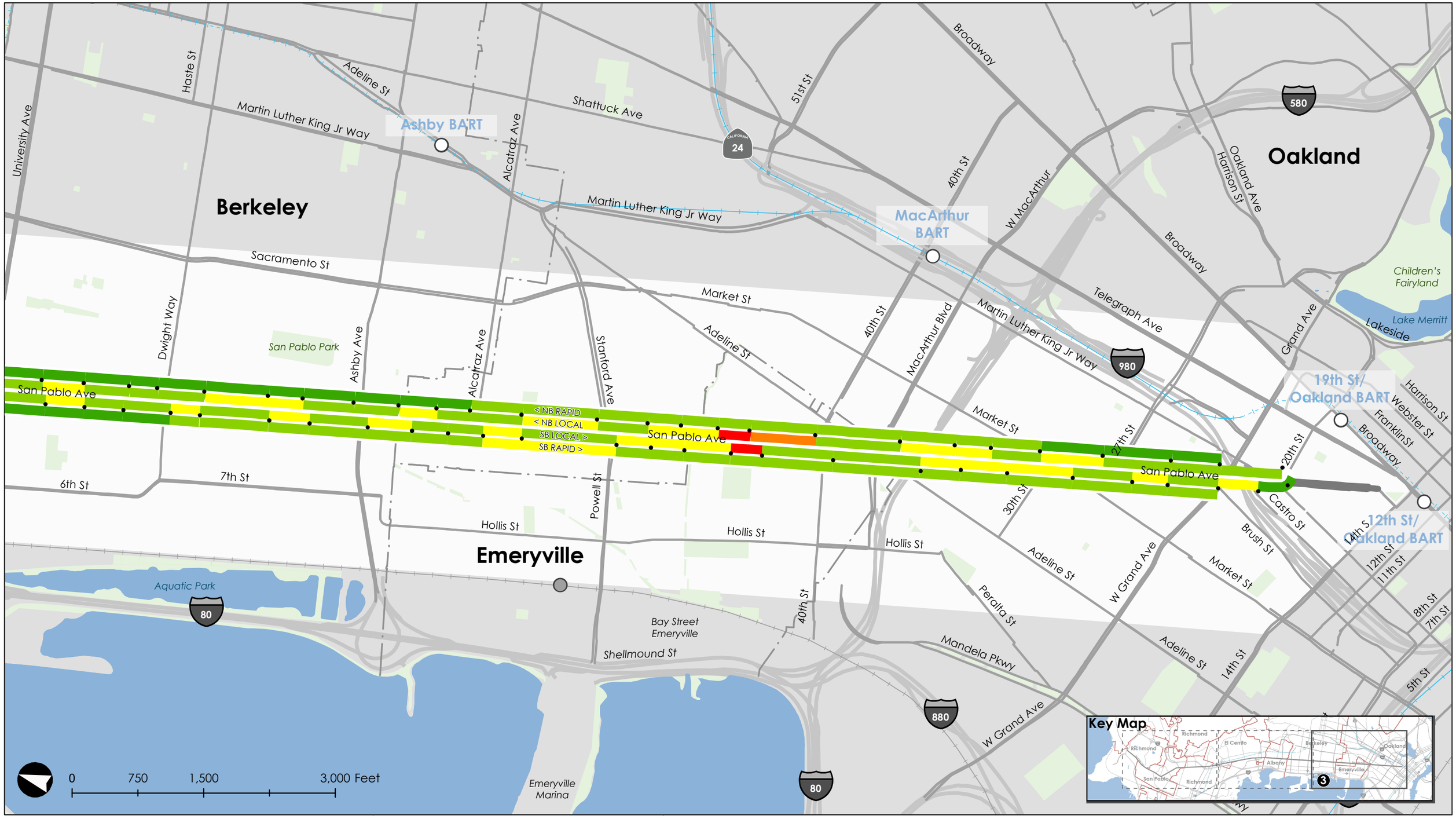
- Bus Stop
- NB Rapid
- NB Local
- SB Local
- SB Rapid

Note: Data shown for AC Transit routes on San Pablo Ave. only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 3-6.2 Existing Bus Variability, PM Peak Hour
San Pablo Corridor between Cutting Boulevard and University Avenue



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Bus Variability (mph/mph)

- 0.00 - 0.25 **High**
- 0.25 - 0.50
- 0.50 - 0.75 **Medium**
- 0.75 - 1.00
- 1.00 - 2.00 **Low**

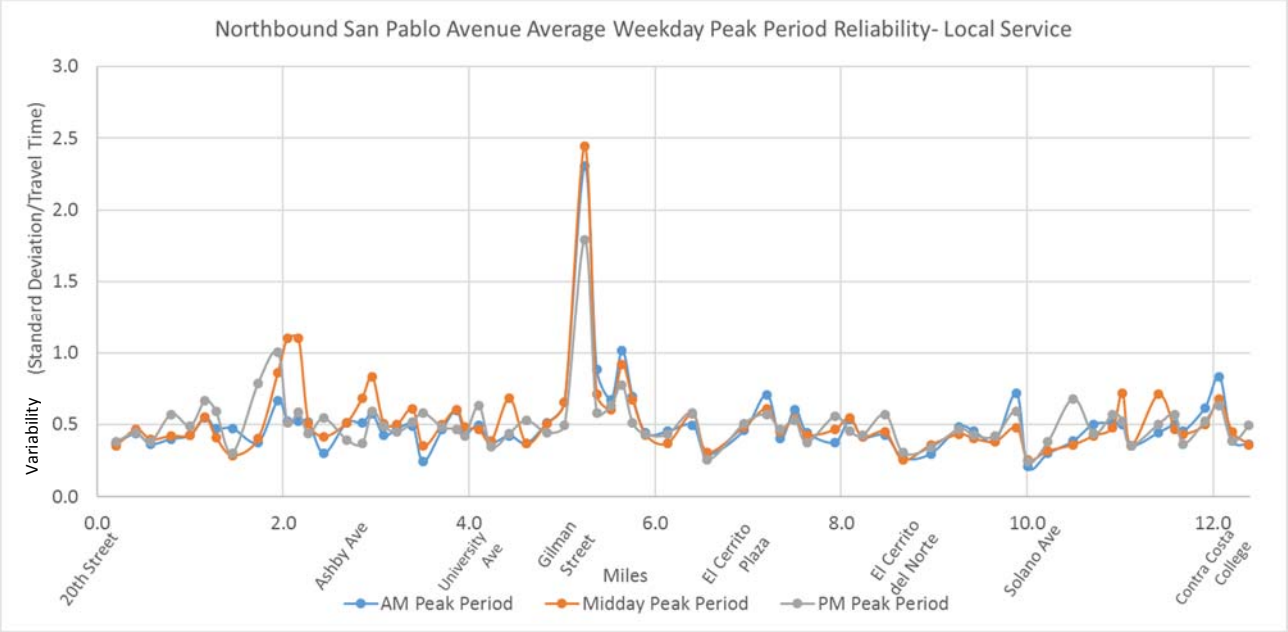
- Bus Stop
- NB Rapid
- NB Local
- SB Local
- SB Rapid

Note: Data shown for AC Transit routes on San Pablo Ave. only
PM Peak Period 4:00PM to 6:00PM
Source: AC Transit

San Pablo Avenue Corridor Project

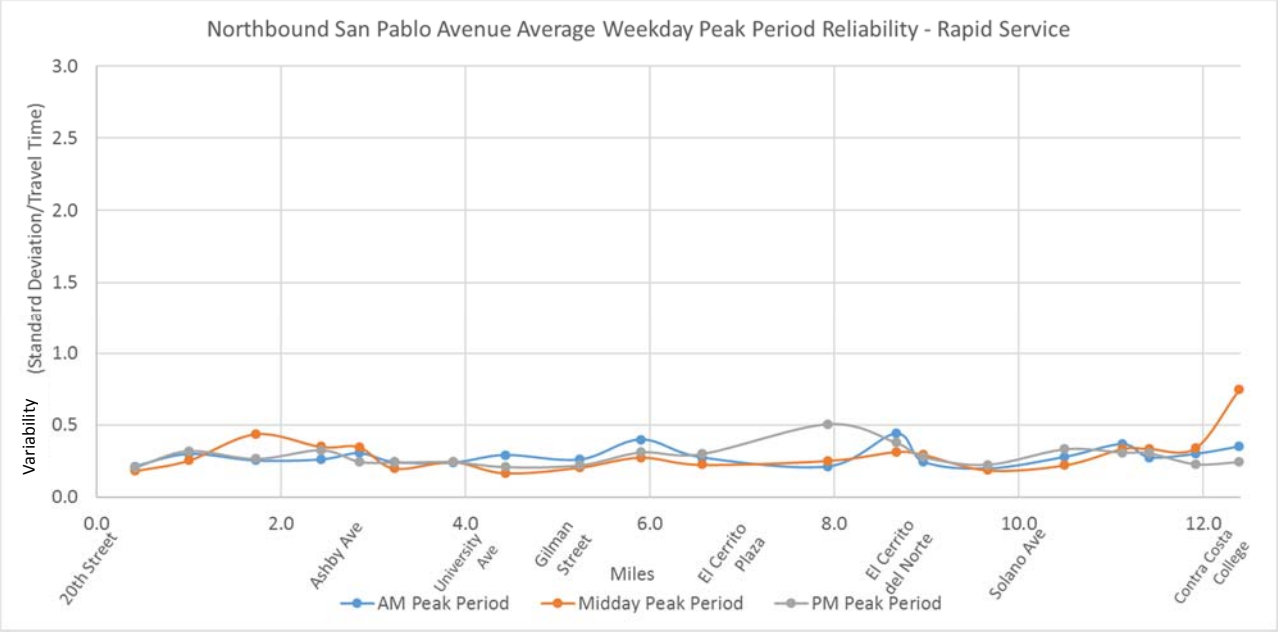
Figure 3-6.3 Existing Bus Variability, PM Peak Hour
San Pablo Corridor between University Avenue and Frank Ogawa Plaza

Graph 3-10. Northbound San Pablo Avenue Average Weekday Peak Period Variability- Local Service



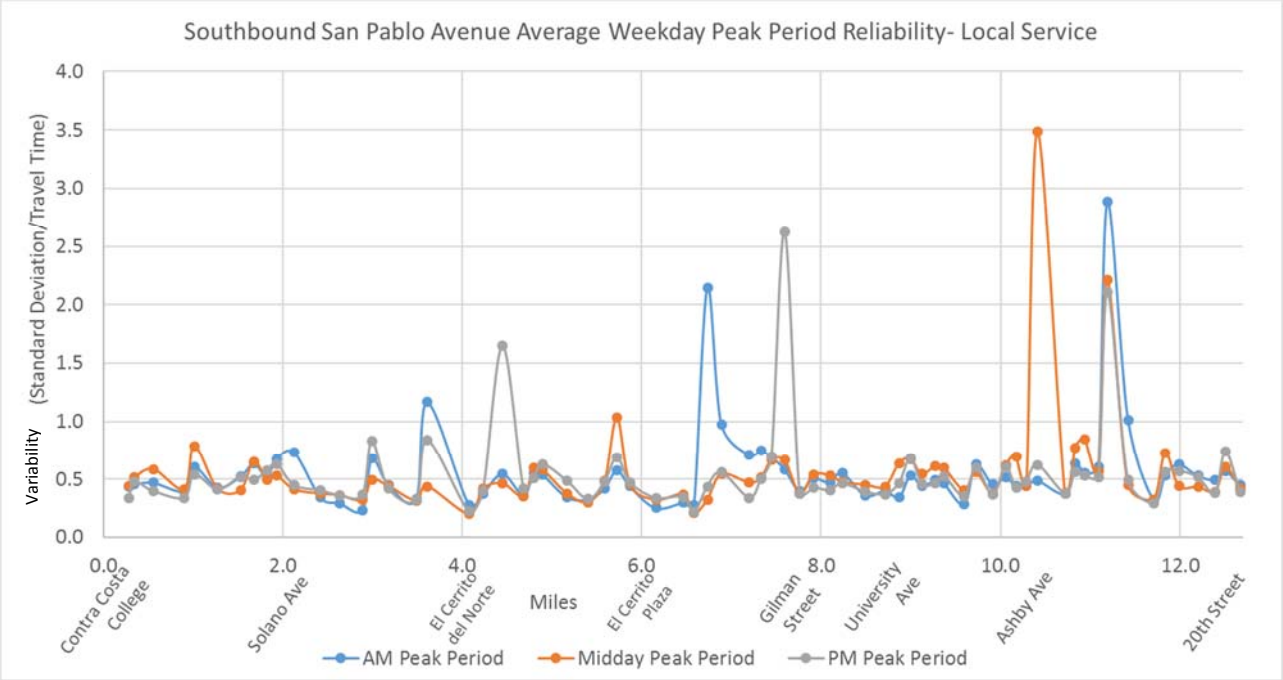
Source: AC Transit, 2017

Graph 3-11. Northbound San Pablo Avenue Average Weekday Peak Period Variability- Rapid Service



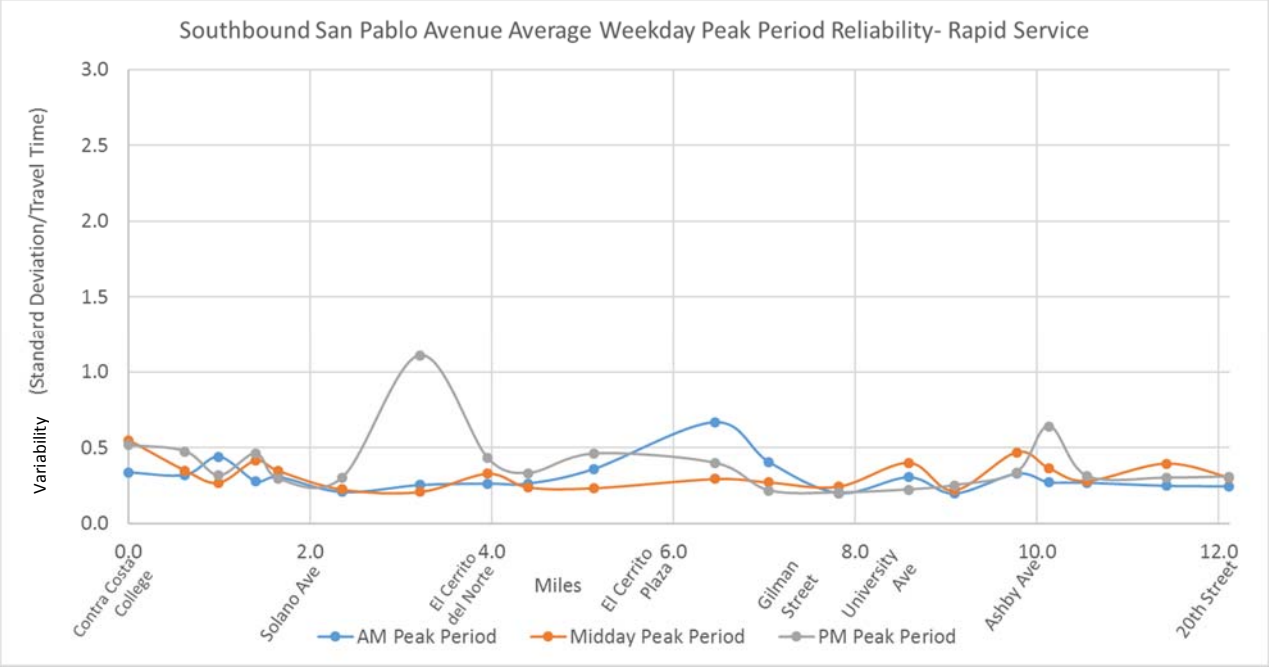
Source: AC Transit, 2017

Graph 3-12. Southbound San Pablo Avenue Average Weekday Peak Period Variability- Local Service



Source: AC Transit, 2017

Graph 3-13. Southbound San Pablo Avenue Average Weekday Peak Period Variability- Rapid Service



Source: AC Transit, 2017

3.4 TRANSIT RELIABILITY AND RIDER EXPERIENCE

This section summarizes transit rider experience along San Pablo Avenue. Rider experience is impacted not only by the travel speed of the bus, discussed in the previous sections, but also by the reliability of a transit service; that is, the likelihood that a bus will arrive and depart on-schedule. The following analysis summarizes the reliability of Route 72R by evaluating consistency and regularity in headway by time of day and location. Route 72R operates at a 12-minute headway throughout the day; as such, a rider would expect to see a Route 72R bus pass every 12 minutes at any given location along the route. The time that elapses between consecutive Route 72R buses going the same direction will be referred to as a gap. The gap equates to the longest duration that a passenger may have to wait for a bus, with the average wait time reflected as one half of the total gap.

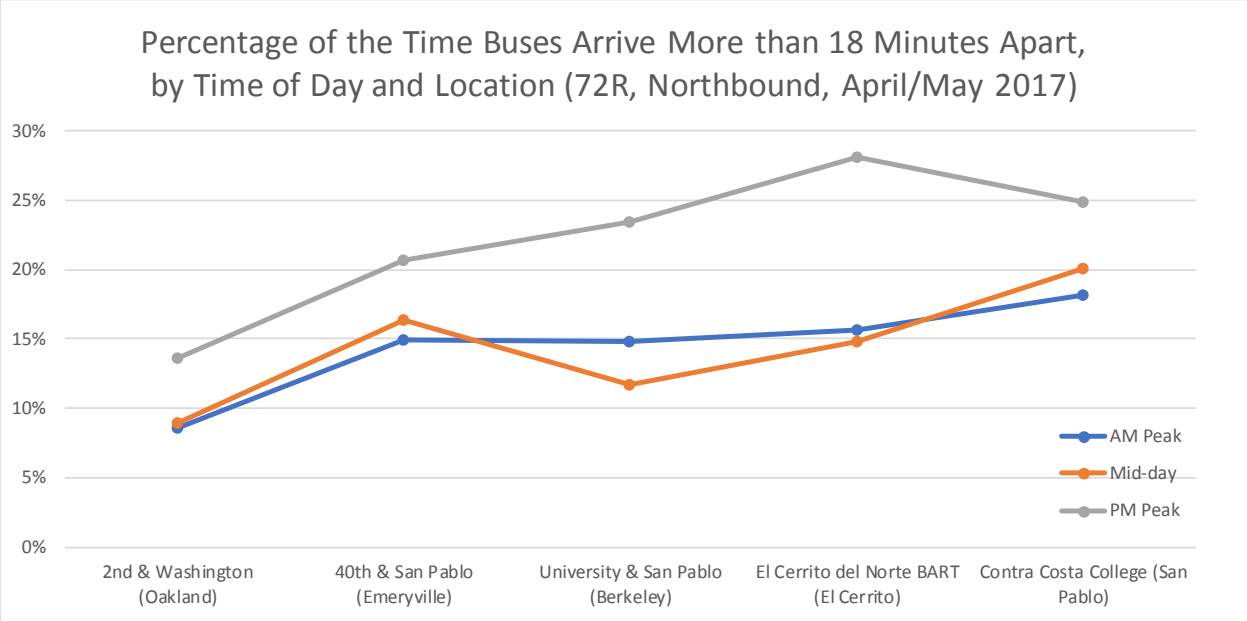
Graphs 3-14 and **3-15** illustrate the percentage of gaps that exceed 18 minutes, or the scheduled headway (12 minutes) plus half the scheduled headway (6 minutes). The location at which gaps were evaluated reflects AC Transit-designated timepoints along Route 72R.

On average throughout the day, approximately one in five buses arrive more than 18 minutes after the prior bus, and reliability worsens in the peak period.

In the northbound direction, the PM peak experiences the highest percentage of buses that arrive more than 18 minutes apart, with almost 30 percent of buses arriving more than 18 minutes apart at the El Cerrito del Norte BART station. In the PM peak, 14 percent of buses begin the route with a gap of at least 18 minutes. In each time period, about 10 percent more buses arrive at the route terminus with a gap greater than 18 minutes than start with a gap greater than 18 minutes. This indicates that reliability issues are associated with both schedule adherence challenges at the beginning of the route and travel time variability along the route.

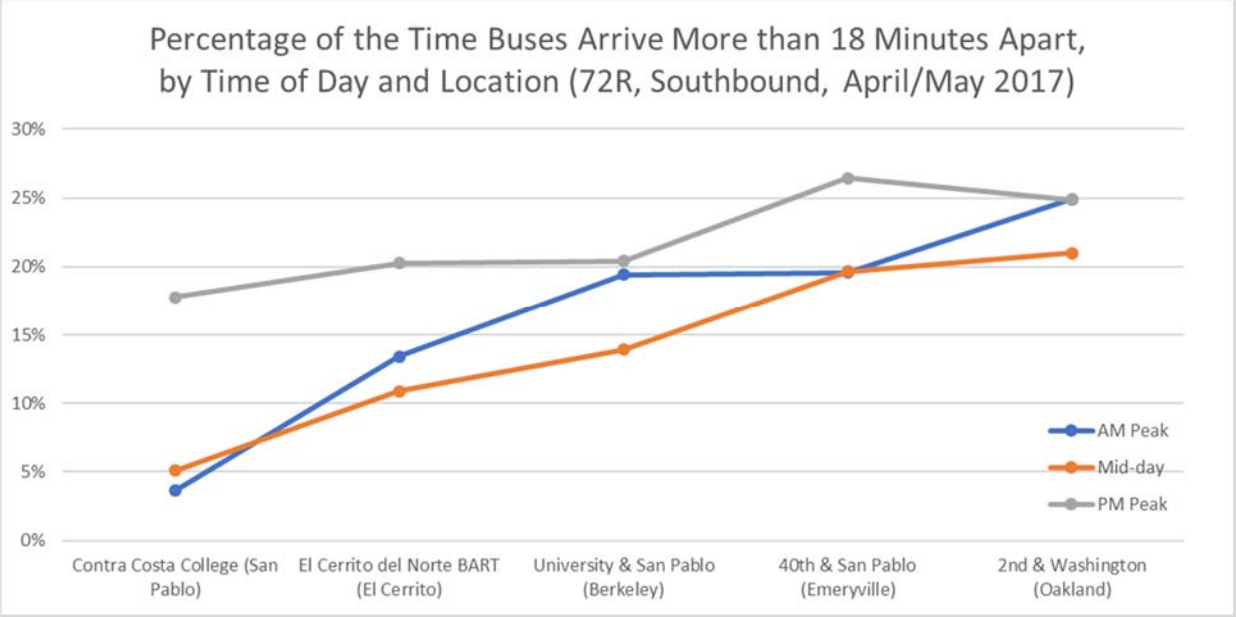
In the southbound direction, similar patterns are experienced in all time periods. In the PM peak, 18 percent of buses begin the route at Contra Costa College with a gap of at least 18 minutes. An additional approximately seven percent of buses arrive at the terminus at 2nd & Washington in Oakland with a gap of 18 minutes or longer. This indicates that the predominate problem in the PM peak is that buses are beginning their route with a long gap, likely due to a late arrival in the northbound direction. In the AM peak, only four percent of buses begin with a gap of 18 minutes or longer, but at the terminus of the route 25 percent of buses have a gap of 18 minutes or longer. This indicates that in the AM peak, the predominate problem is caused by travel time variability along the route.

Graph 3-14. Percentage of Time Buses Arrive More than 18 Minutes Apart, by Time of Day and Location (72R, Northbound, April/May 2017)



Source: AC Transit, 2017

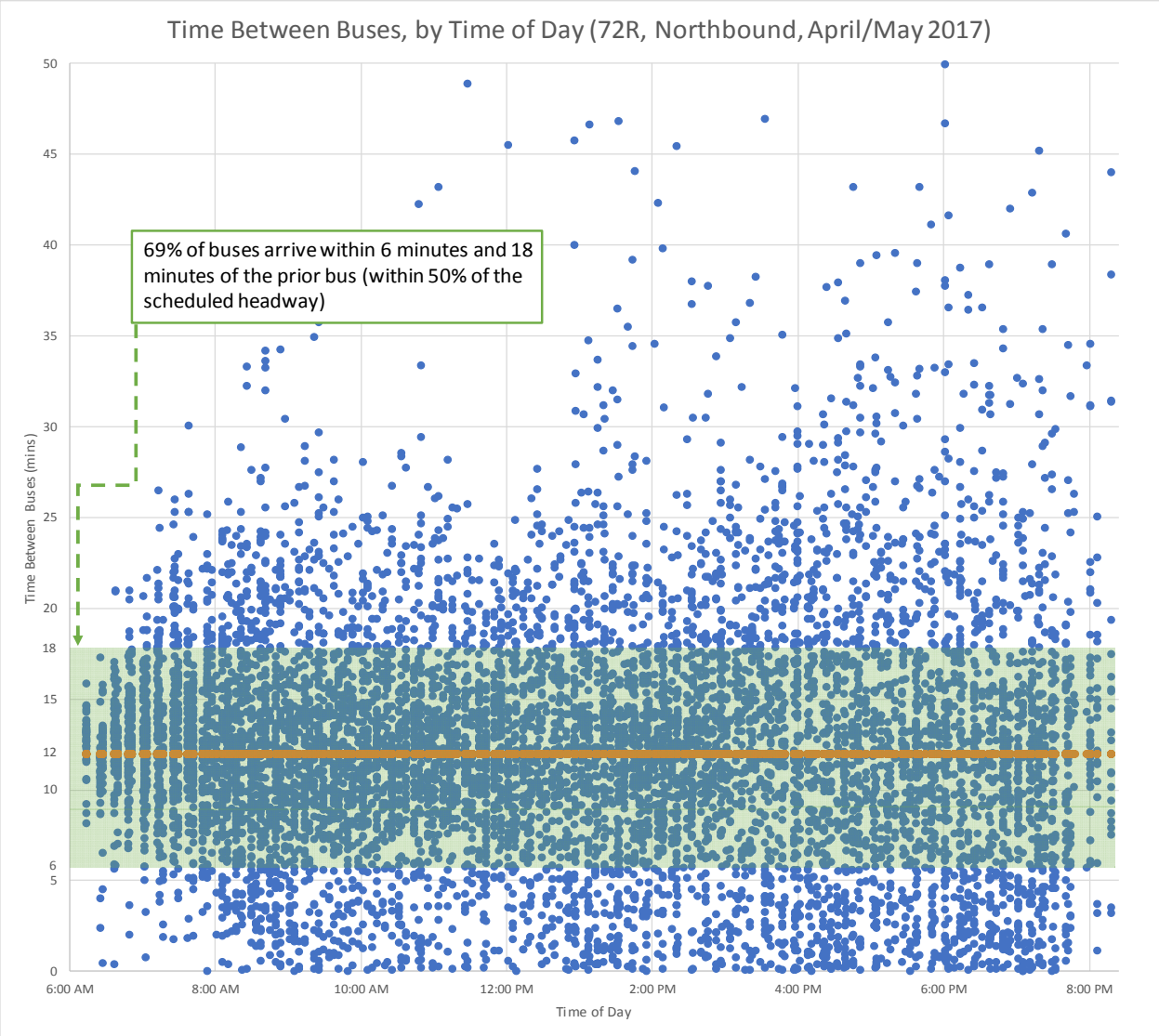
Graph 3-15. Percentage of Time Buses Arrive More than 18 Minutes Apart, by Time of Day and Location (72R, Southbound, April/May 2017)



Source: AC Transit, 2017

Graphs 3-16 and **3-17** illustrate the time between buses by time of day. The horizontal orange line reflects the scheduled headway of Route 72R, and the green shading reflects six minutes (half the scheduled headway) before and after the scheduled headway. In the northbound direction, 69 percent of buses arrive within six minutes and 18 minutes of the prior bus (i.e., within 50 percent of the scheduled headway), equating to almost one-third of buses with a gap from the previous bus outside this range. Approximately five percent of buses experience a gap of more than double the scheduled headway (more than 24 minutes). As shown by the scatter of dots, gap variation is generally higher during the latter part of the day.

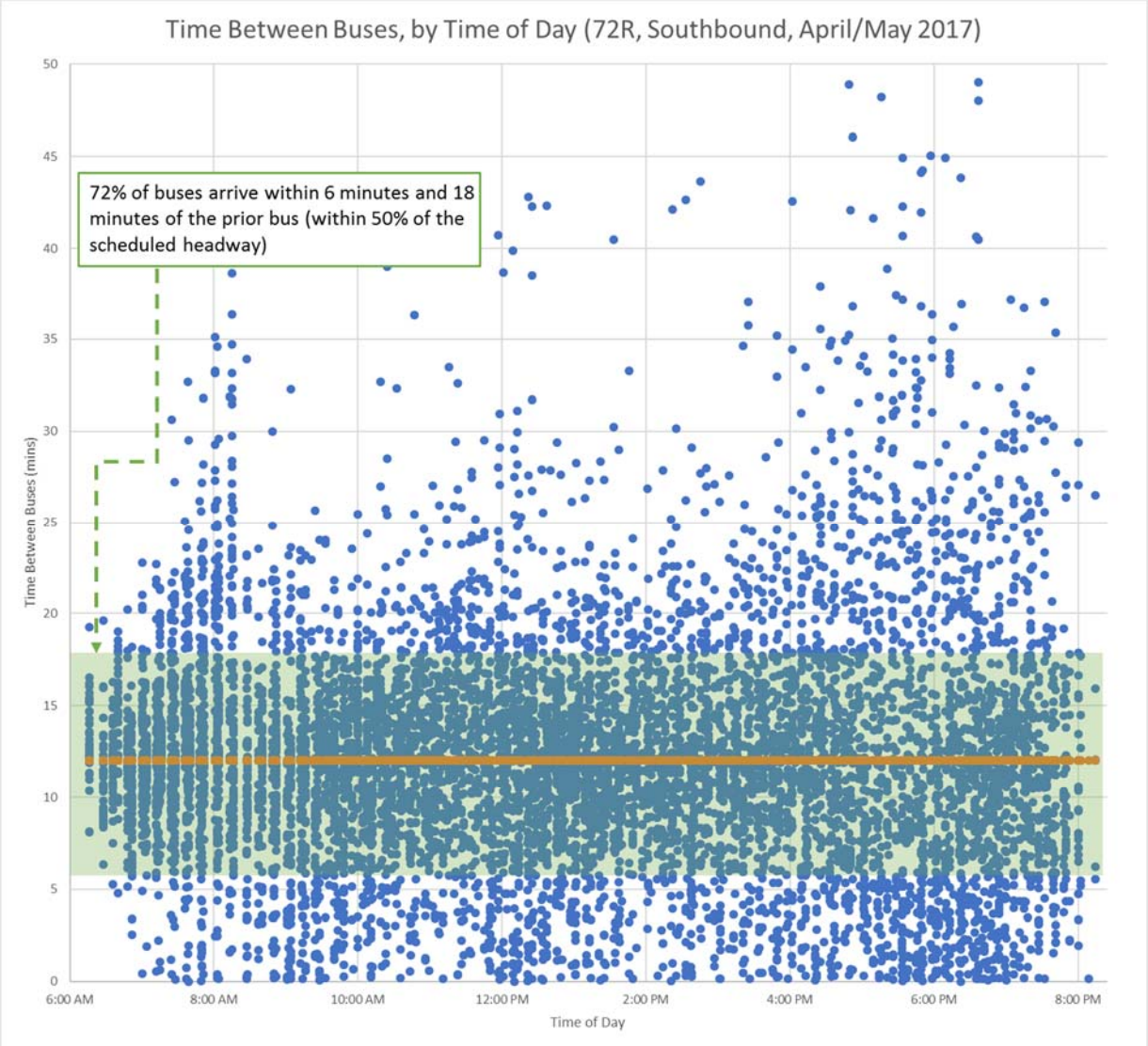
Graph 3-16. Time Between Buses, by Time of Day (72R, Northbound, April/May 2017)



Source: AC Transit, 2017
Note: Each dot represents the time between one bus and the previous bus

In the southbound direction, 72 percent of buses arrive between six minutes and 18 minutes after the prior bus and four percent of buses arrive after more than double the scheduled headway.

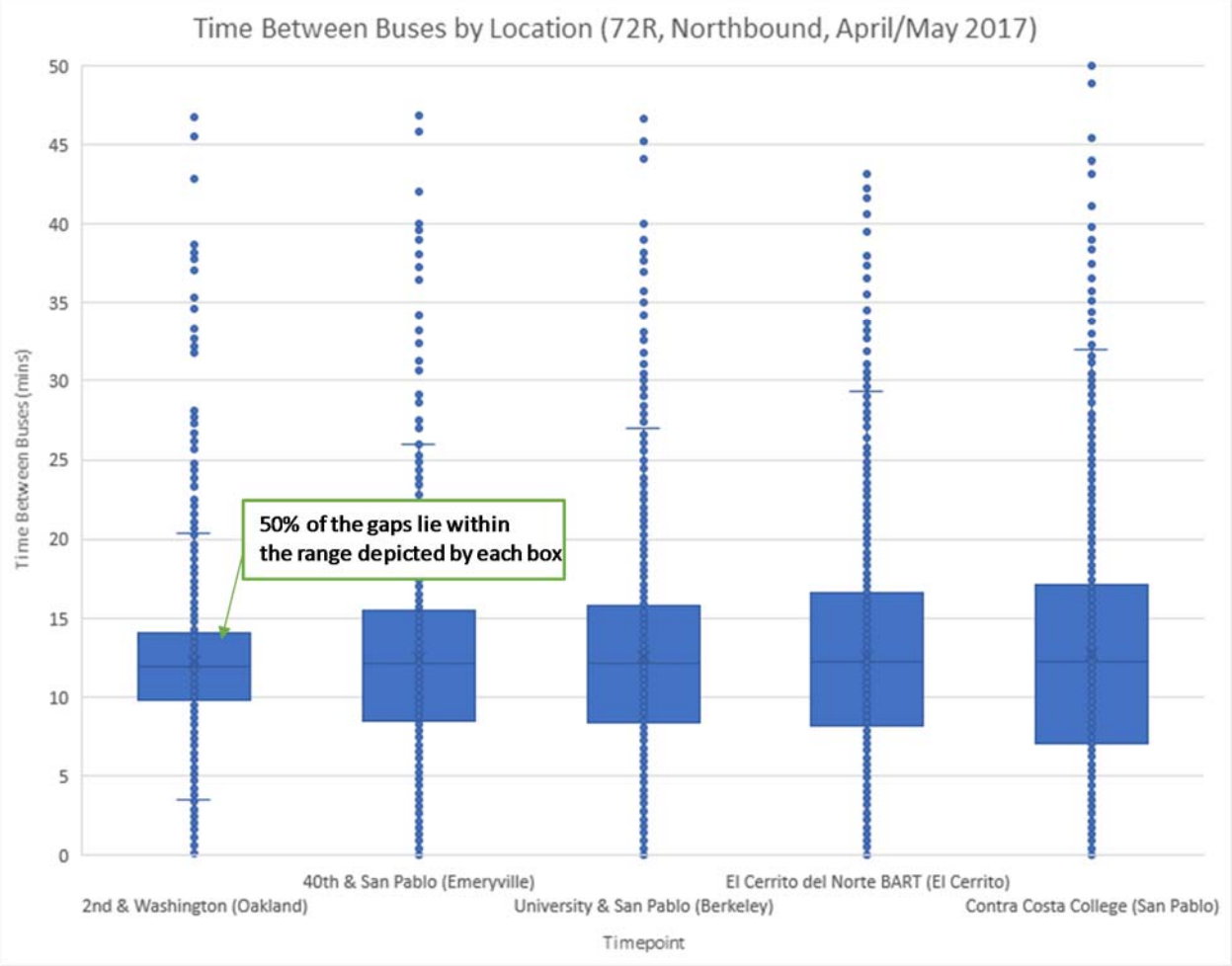
Graph 3-17. Time Between Buses, by Time of Day (72R, Southbound, April/May 2017)



Source: AC Transit, 2017
Note: Each dot represents the time between one bus and the previous bus

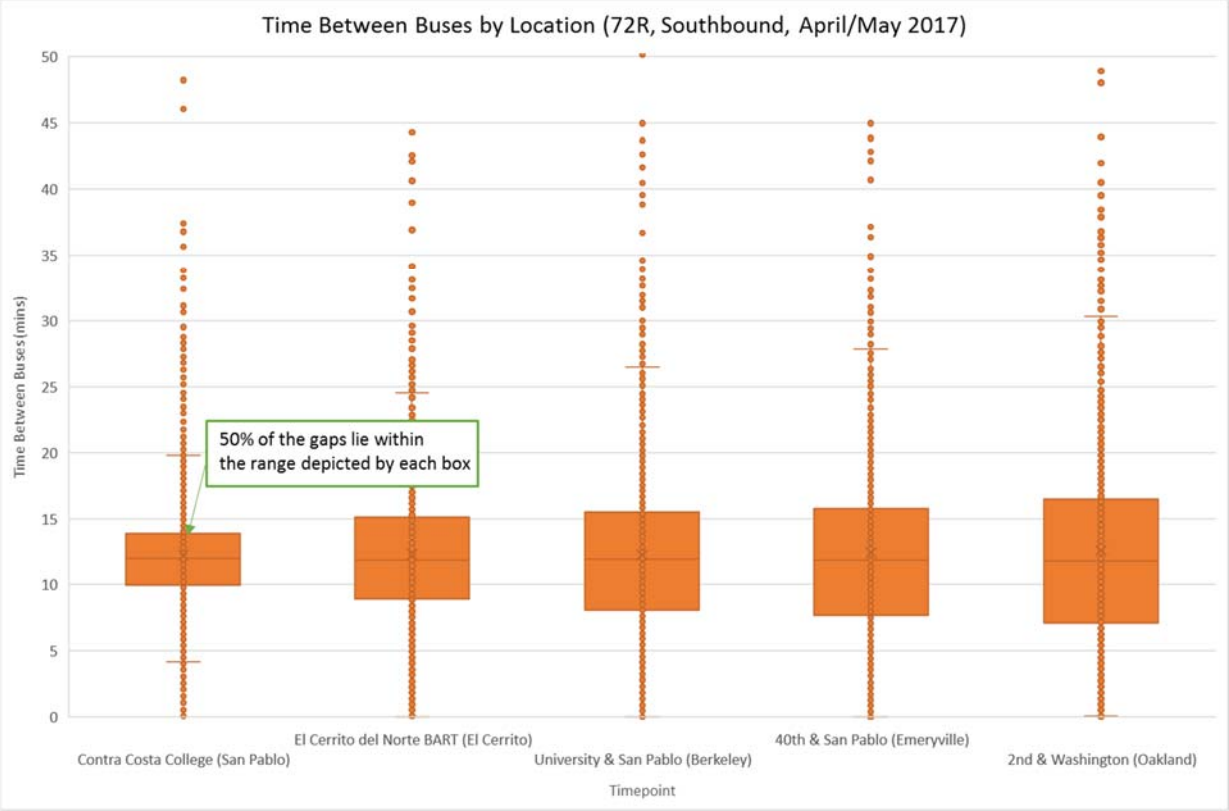
Graphs 3-18 and **3-19** illustrate the time between buses by timepoint, highlighting the range of gaps within which 50 percent of buses arrive. In both the northbound and southbound directions, as buses travel further from the starting location, the range of time between buses increases, reflecting travel time variability within the corridor. This pattern suggests that buses get more bunched (short gaps and long gaps) progressively through the route. The variation in gaps more than doubles by the end of the route, compared to the start.

Graph 3-18. Time Between Buses by Location (72R, Northbound, April/May 2017)



Source: AC Transit, 2017
Note: Each dot represents the time between one bus and the previous bus

Graph 3-19. Time Between Buses by Location (72R, Southbound, April/May 2017)



Source: AC Transit, 2017
Note: Each dot represents the time between one bus and the previous bus

Average actual passenger wait times were calculated for each timepoint for each direction of Route 72R. The average wait time if buses strictly adhered to schedules, assuming random passenger arrivals, would be six minutes, equal to half of the headway. With increased variability, average wait times increase. These are reflected in **Table 3-11**. As shown in the table, the average actual wait time for a bus is much longer than the wait time would be if there was strict schedule adherence.

TABLE 3-10: AVERAGE PASSENGER WAIT TIME FOR ROUTE 72R AT TIMEPOINTS

Northbound			Southbound		
Location	Average Actual Wait	% Increase compared to Scheduled Wait	Location	Average Actual Wait	% Increase compared to Scheduled Wait
2nd & Washington (Oakland)	7.3	22%	Contra Costa College (San Pablo)	7.1	18%
40th & San Pablo (Emeryville)	8.0	34%	El Cerrito del Norte BART (El Cerrito)	7.7	28%
University & San Pablo (Berkeley)	8.2	37%	University & San Pablo (Berkeley)	8.0	34%
El Cerrito del Norte BART (El Cerrito)	8.4	40%	40th & San Pablo (Emeryville)	8.8	46%
Contra Costa College (San Pablo)	9.2	53%	2nd & Washington (Oakland)	9.1	52%

Source: AC Transit, 2017.

3.5 TRANSIT TRANSFER SUMMARY

Table 3-11 lists the four most common destination stations for passengers transferring from AC Transit to BART at 12th Street, 19th Street, El Cerrito Plaza, and El Cerrito del Norte. On an average weekday, 1,673 passengers transfer from AC Transit bus routes to BART at these four stations. Embarcadero Station is one of the top five destinations for all four BART stations in the project area. Both BART stations in Oakland also share Montgomery Station and Civic Center Station as top destinations, and both El Cerrito stations share Downtown Berkeley as their most common destination station.

TABLE 3-11: AC TRANSIT TRANSFERS TO BART					
BART Origin Station	Most Common BART Destination Stations				
	1	2	3	4	5
12th Street/ Oakland	Montgomery	Embarcadero	Civic Center	Powell Street	Downtown Berkeley
19th Street/ Oakland	Embarcadero	Montgomery	Civic Center	Powell Street	16th Street Mission
El Cerrito Plaza	Downtown Berkeley	Oakland City Center	Embarcadero	Montgomery	Civic Center
El Cerrito del Norte	Downtown Berkeley	Powell Street	Embarcadero	Montgomery	MacArthur

Source: AC Transit, 2017; Clipper, 2017.

Table 3-12 lists the three most common origin stations for people transferring from BART to AC Transit at 12th Street, 19th Street, El Cerrito Plaza, and El Cerrito del Norte. On an average weekday, 1,568 passengers transfer from BART to an AC Transit Bus Route. Montgomery Station is one of the top five origins for all four stations in the project area. Civic Center Station and Powell Street Station are each in the top three destinations for three of the four stations of interest.

TABLE 3-12: BART TRANSFERS TO AC TRANSIT					
BART Destination Station	Most Common BART Origin Stations				
	1	2	3	4	5
12th Street/ Oakland	Civic Center	Montgomery	Powell Street	Embarcadero	Downtown Berkeley
19th Street/ Oakland	Montgomery	Civic Center	Embarcadero	Powell Street	16th Street Mission
El Cerrito Plaza	Downtown Berkeley	Powell Street	Montgomery	Civic Center	12th Street/ Oakland
El Cerrito del Norte	Downtown Berkeley	Powell Street	Montgomery	Civic Center	12th Street/ Oakland

Source: AC Transit, 2017; Clipper, 2017.

3.6 EXISTING CHALLENGES AS IDENTIFIED BY AC TRANSIT

AC Transit provided information on existing challenges and opportunities in the Study Area, as summarized below:

- WestCAT and AC Transit have separate transit centers on different sides of The Shops at Hilltop which doesn't provide an ideal transfer experience. Route 72 travels through a residential area between Contra Costa College and The Shops at Hilltop.
- The existing transit signal priority system grants limited green extension or early green request and only Route 72R can request the green extension call. Through the Rapid Corridor Project, there may be an opportunity to include all 72 lines and allow more frequent green extension.
- Congestion causes delays across different services, including Rapid and Local routes, resulting in declining operating speeds.
- The 72R performs significantly better in terms of speed and variability when compared to the local.
- Rapid shelters are old and need improvements.
- Opportunity to extend the bus bay at the southbound Solano bus stop to avoid conflict with turning vehicles.
- Operators have limited access to restrooms in general.
- Most Rapid stops have adequate stop lengths. Many non-Rapid stops do not meet today's standards in terms of bus stop lengths and accessibility.

3.7 KEY FINDINGS

This section summarizes key findings for transit on San Pablo Avenue and in the Study Area.

3.7.1 EXISTING OPPORTUNITIES AND CHALLENGES

A list of potential challenges and opportunities is provided below based on the analysis summarized herein:

- A comprehensive inventory of AC Transit bus stops should be completed to understand existing conditions. In general, both Local and Rapid stops could be upgraded to provide more consistent amenities by type of service and higher quality, cleaner, better maintained infrastructure where it exists, particularly for the Rapid service.
- Thirty percent of Route 72R bus stops are located either near-side or mid-block. Opportunity to locate stops far-side to improve access and minimize signal delay impacts.
- Opportunity to consolidate Local bus stops with low ridership with others that are in close proximity.

- AC Transit boardings along San Pablo are relatively evenly distributed between 7:00AM and 6:00PM. Recommendations should consider improvements that will not only benefit peak period riders, but also riders during mid-day and shoulder periods.
- Opportunity to improve station design at El Cerrito del Norte BART station to minimize dwell time and out-of-direction travel to reduce transit variability. The station is currently undergoing modernization, so the new design and operations will need to be considered.
- Opportunity to implement intersection and segment improvements to enhance speed and reliability in the northbound direction at locations including, but not limited to, these intersecting streets: San Pablo Dam Road, El Cerrito del Norte BART, El Cerrito Plaza BART, Buchanan Street, Ashby Avenue, and Stanford Avenue.
- Opportunity to implement intersection and segment improvements to enhance speed and reliability in the southbound direction at locations including, but not limited to, these intersecting streets: Gilman Street, El Cerrito Plaza BART, and Road 20.
- Opportunity to create bus stops as urban spaces that foster urban character and community building, similar to that installed in the City of Albany on Solano Avenue at Cornell.

3.7.2 TRANSIT RIDERSHIP

- There are approximately 19,600 weekday boardings on AC Transit buses in the Study Area; 57 percent of these boardings occur at bus stops along San Pablo Avenue. The remaining 43 percent occur within the study area along parallel and cross-streets to San Pablo Avenue.
- Ridership is relatively evenly distributed throughout the day. Sixteen percent of daily boardings in the Study Area occur in the AM peak period (7:00 AM to 9:00 AM), 13 percent occur in the Mid-Day peak period (11: 00 AM to 1:00 PM), and 16 percent occur in the PM peak period (4:00 PM to 6:00 PM).
- The El Cerrito del Norte BART Station bus stop has the highest ridership in the Study Area with an average of 1,478 weekday boardings and 1,772 weekday alightings.
- In both the northbound and southbound directions, the cumulative load notably changes after University Avenue with lower loads south of University and higher loads north of University.
- The highest load levels are between the El Cerrito Del Norte BART Station and University Avenue, much of it associated with BART access.
- Rising ridership loads in the AM peak period traveling southbound and in the PM peak period traveling northbound reflect directional commute patterns.
- The 12th Street and 19th Street stations each serve approximately the same number of passengers and serve approximately 2.6 times the passengers at the El Cerrito Plaza station and approximately 1.5 times the passengers at the El Cerrito

del Norte station. The El Cerrito del Norte station serves almost double the passengers as the El Cerrito Plaza station.

3.7.3 TRANSIT TRAVEL TIME, SPEED, AND VARIABILITY

- In both directions, transit travel times increase throughout the day, with the PM peak period exhibiting the longest travel times in both directions; however, Rapid service sees a much bigger change in performance. This suggests that the source of delay is congestion at intersections, since ridership appears to be balanced.
- The average speed of local routes ranges from 8.7 to 12.4 mph, while the average speed of the Rapid route ranges from 10.0 to 14.6 mph. In the northbound direction, the Local service has low speeds, particularly in certain locations, traveling close to 5 MPH during AM, Mid-Day, and PM peak periods near the Gilman Street intersection and the El Cerrito del Norte BART station.
- The Rapid service has less variation in speed than the Local service along San Pablo Avenue.
- In the northbound direction, during all three peak periods, the segment traversing Gilman Street has notably high travel time variability. In the southbound direction, the Local and Rapid routes both experience notably high travel time variability around the El Cerrito del Norte BART station.
- High variability is also an issue between El Cerrito Plaza BART Station and Gilman Street and in the southern portion of San Pablo Avenue between Stanford Avenue and 40th Street.

4. BICYCLES & PEDESTRIANS

This chapter provides a summary of the bicycle and pedestrian infrastructure, including areas with pedestrian emphasis, and corresponding comfort indices. A detailed discussion of collision history is provided in Chapter 8. A detailed evaluation of land uses and the existing streetscape environment and how they relate to pedestrian activity along the San Pablo Avenue Corridor are presented in Chapter 10.

4.1 BICYCLE NETWORK

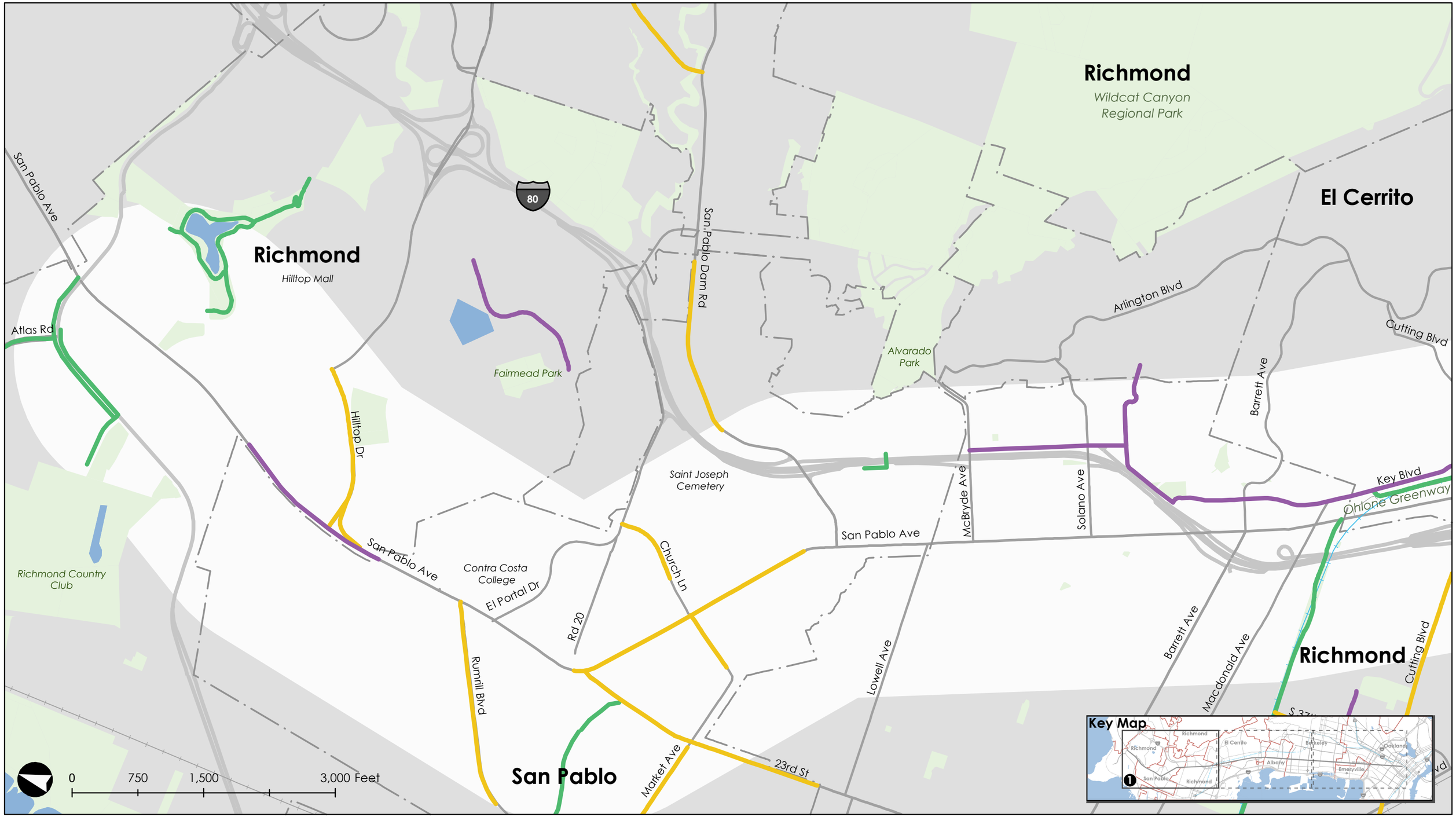
In California, bicycle facilities are generally categorized into the following types:

- **Class I Multi-Use Trails/Paths** – These are spaces for the exclusive use of bicyclists and pedestrians and are located off-street. Recreational trails can be considered Class I facilities. Class I paths are typically eight to ten feet wide excluding shoulders and are generally paved.
- **Class II Bicycle Lanes** – These facilities provide a dedicated area for bicyclists within the paved street width using striping and appropriate signage. These facilities are typically six feet wide.
- **Class III Bicycle Routes** – These facilities are along streets that do not provide sufficient width for dedicated bicycle lanes. Signage and pavement markings inform drivers to expect bicyclists.
- **Class IV Separated Bikeways** – These facilities provide a dedicated area for bicyclists within the paved street width and have physical separation from vehicle traffic. Separation may include, but is not limited to, grade separation, flexible posts, physical barriers, or on-street parking.

Several cities also differentiate Class III bicycle routes into the following two sub-categories:

- **Class III Bicycle Routes** (sometimes called "Arterial Bicycle Routes", e.g. in Berkeley) – These facilities are found along some arterial streets where bicycle lanes are not feasible and parallel streets do not provide adequate connectivity. These are travel lanes in which bicyclist and autos share the space. They are commonly denoted with sharrows (e.g. shared-lane bicycle marking) stencils and signage are used to encourage shared use.
- **Class III Bicycle Boulevards** – These are bicycle routes that are located along residential streets with low traffic volumes and low vehicle speeds. Assignment of right-of-way to the route, traffic calming measures and bicycle traffic signal actuation are used to prioritize through-trips for bicycles.

Figure 4-1 presents the existing bicycle facilities in the Study Area. For most of its length, San Pablo Avenue functions as a bicycle route, with bicyclists and drivers sharing a travel lane. This is a deterrent for many bicyclists given the 30 mph typical speed limit along most of the corridor, relatively narrow travel lanes at 12 feet, and the presence of



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Existing Bicycle Facility

- Class I: Bicycle Path
- Class II: Bicycle Lane
- Class III: Bicycle Route
- Class IV: Protected Bicycle Lane
- Class III: Bicycle Boulevard

ALAMEDA County Transportation Commission

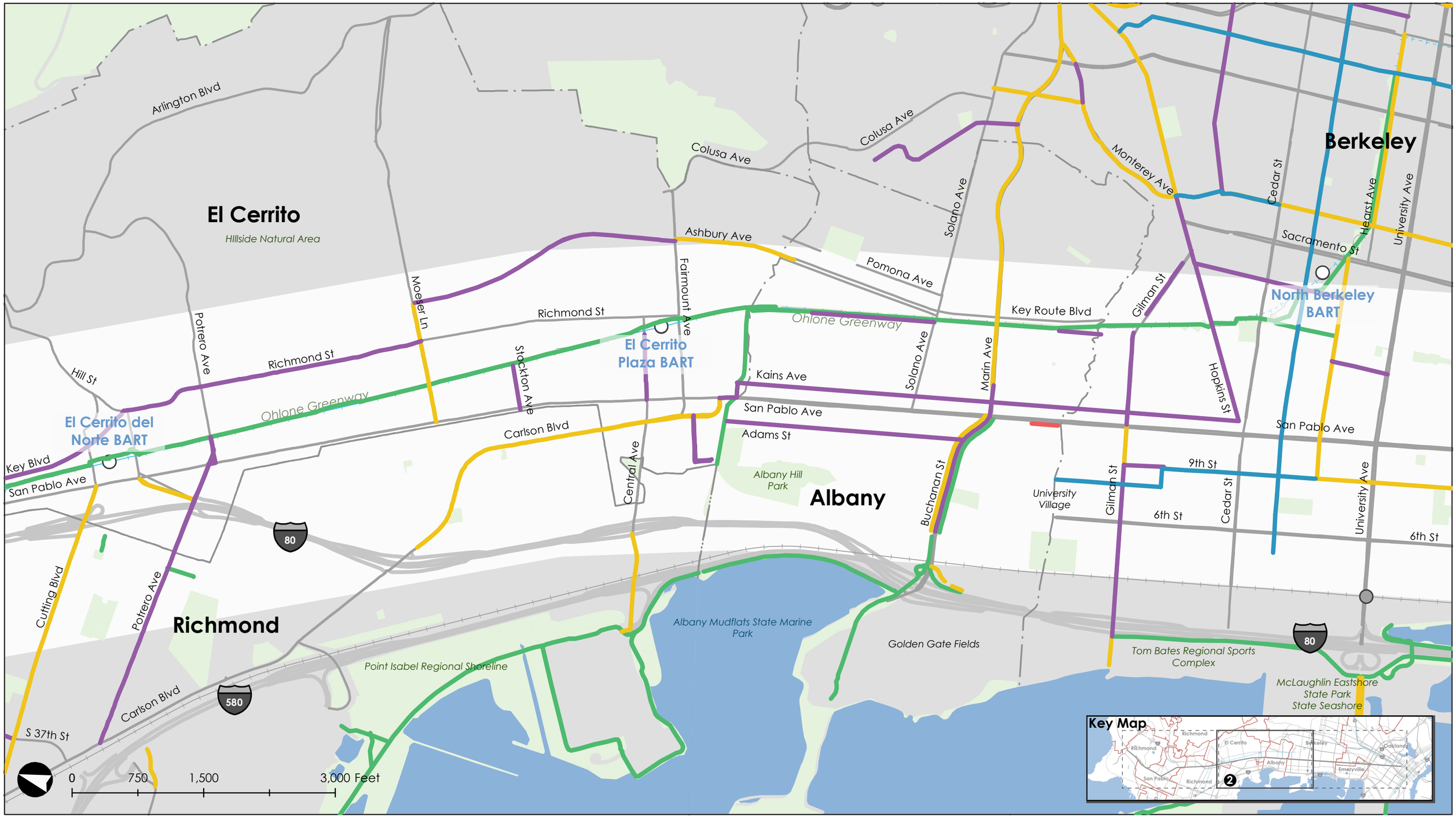
Data Source: City of Oakland Bike Network (2017), City of Emeryville (2017), City of Richmond, Albany ATP, El Cerrito ATP, Multimodal Arterial Plan (2014), Alameda County Transportation Commission

San Pablo Avenue Corridor Project

Figure 4-1.1

Existing Bicycle Network

San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard



Legend:

- BART Station
- BART Above/Below Ground
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- Class III: Bicycle Boulevard
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ALAMEDA County Transportation Commission

Data Source: City of Oakland Bike Network (2017), City of Emeryville (2017), City of Richmond, Albany ATP, El Cerrito ATP, Multimodal Arterial Plan (2014), Alameda County Transportation Commission

San Pablo Avenue Corridor Project

Figure 4-1.2

Existing Bicycle Network

San Pablo Corridor between Cutting Boulevard and University Avenue

Berkeley
Oakland
Emeryville
Ashby BART
MacArthur BART
19th St/ Oakland BART
12th St/ Oakland BART
University Ave
Haste St
Adeline St
Woolsey St
Martin Luther King Jr Way
Shattuck Ave
Alcatraz Ave
51st St
42nd St
Broadway
40th St
W MacArthur
Oakland Ave
Harrison St
580
24
King St
California St
Sacramento St
55th St
Market St
Children's Fairyland
Lake Merritt
Lakeside
Grand Ave
Telegraph Ave
Channing Way
Dwight Way
Russell St
Ashby Ave
San Pablo Park
Alcatraz Ave
Stanford Ave
Adeline St
42nd St
40th St
MacArthur Blvd
Martin Luther King Jr Way
980
West St
Market St
27th St
20th St
Harrison St
Webster St
Franklin St
Broadway
San Pablo Ave
9th St
47th St
45th St
San Pablo Ave
Emery St
6th St
7th St
Heinz Ave
Powell St
53rd St
45th St
40th St
32nd St
30th St
Castro St
Brush St
Hollis St
Horton St
65th St
Overland Ave
Adeline St
W Grand Ave
Market St
12th St
11th St
8th St
7th St
Aquatic Park
80
Bay Street Emeryville
Shellmound St
40th St
Peralta St
Mandela Pkwy
Adeline St
14th St
5th St
880
W Grand Ave
Emeryville Marina
80
0 750 1,500 3,000 Feet

Key Map

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Existing Bicycle Facility

- Class I: Bicycle Path
- Class II: Bicycle Lane
- Class III: Bicycle Route
- Class III: Bicycle Boulevard
- Class IV: Protected Bicycle Lane

ALAMEDA County Transportation Commission

Data Source: City of Oakland Bike Network (2017), City of Emeryville (2017), City of Richmond, Albany ATP, El Cerrito ATP, Multimodal Arterial Plan (2014), Alameda County Transportation Commission

San Pablo Avenue Corridor Project

Figure 4-1.3

Existing Bicycle Network

San Pablo Corridor between University Avenue and Frank Ogawa Plaza

on-street parking, as bicyclists frequently ride in the "door zone" adjacent to parked cars.

4.1.1 SAN PABLO AVENUE BICYCLE FACILITIES

As shown on Figure 4-1, a continuous and connected bicycle network is not provided along San Pablo Avenue.

Recently, some bikeway improvements have been implemented on San Pablo Avenue. This includes a 0.2-mile long, two-way Class IV separated bikeway on the west side of San Pablo Avenue between Marin Avenue and Dartmouth Street (Albany). A pedestrian hybrid beacon (PHB) at Dartmouth Street was installed to facilitate access to and from the separated bikeway. The separated bikeway is expected to extend to the existing Class I path on Marin Avenue once funding is secured.

In Oakland, bicycle lanes were installed northbound between 17th Street and Grand Avenue.

Newly Installed Two-Way Separated Bikeway on San Pablo Avenue in the City of Albany (Photo Credit: Sergio Ruiz via Flickr)

4.1.1.1 Crossing San Pablo Avenue

While San Pablo Avenue does not have continuous or connected bicycle facilities, it is a major cross-street for many east-west bikeways, including bicycle lanes and bicycle routes. Many intersections on San Pablo Avenue are side-street stop-controlled intersections that can be difficult to navigate due to multiple travel lanes in either direction with no median refuge and limited gaps in oncoming traffic. Further, many intersections on San Pablo Avenue are T-intersections or skewed intersections, requiring bicyclists trying to travel east or west to detour onto San Pablo Avenue to get to their connection. This is the case for east-west bicycle routes such as the Russel Street/Heinz Avenue route (Berkeley) and at the 45th Avenue route (Emeryville). As a result, San Pablo Avenue may currently operate as a barrier to east-west bicycle network connectivity.

4.1.1.2 Bicycle Volumes

AM and PM peak hour bicycle turning movement volumes (based on counts collected in 2016) are presented in **Figure 4-2** for key signalized intersections along San Pablo Avenue. As shown on Figure 4-2, bicycle volumes are substantially higher along the southern portion of San Pablo Avenue, and gradually decrease in the central and northern portions of San Pablo Avenue. For example, a total of 148 bicyclists were counted traveling through the San Pablo Avenue/W. Grand Avenue intersection in the City of Oakland in the PM peak period, compared to only one bicyclist that was counted at the San Pablo Avenue/Robert Miller Drive intersection in the City of Richmond.

4.1.2 PARALLEL BICYCLE FACILITIES

There is not a continuous parallel roadway to San Pablo Avenue through the Study Area. As a result, parallel bicycle facilities may serve bicycle travel short- to medium- trip length, within one neighborhood or even city, but do not serve longer trips along full length the Project. There are opportunities for parallel facilities and some existing longer segments of parallel bikeway on most portions of the corridor. However, even those segments include substantial barriers that would need to be improved to create a viable alternative bikeway. Common barriers include:

- **No Parallel Facility**: In some areas there is simply no parallel facility in the roadway and path network. This is portions of Richmond and San Pablo.
- **Significant distance from parallel facility**: This is common on the east side of the Project Corridor through Berkeley (note: a proposed bicycle boulevard on the Mabel Street corridor would address this) and in Oakland, where the street grid is not oriented to San Pablo Avenue.
- **Difficult Crossings**: While bicycle boulevards provide low stress alternatives to traveling on major roadways, they also must cross major east-west roadways. These are often uncontrolled, side-street stop crossings that can be difficult to

navigate, especially when there is limited gaps in traffic and/or multiple lanes of traffic. This is true for the long segments of existing bicycle boulevards in Berkeley; though the City's Bicycle Master Plan proposes many crossing improvements to address these. In some cases, difficult crossings may have signals but have heavy auto congestion and turning movements that bicyclists must navigate, such as the Horton Avenue/Mandela Parkway corridor near 40th Street/Shellmound Street.

- **Limited Wayfinding**: Where gaps in the existing parallel facilities exists, there is frequently complex routing to get from one bikeway to another. This is a barrier for many novice bicyclists as well as confident bicyclists not familiar with the area.

4.1.2.1 Northern Corridor

This segment provides the most limited parallel bicycle facilities to San Pablo Avenue. In many instances, there are no parallel roadways or paths to San Pablo Avenue. The Key Street corridor provides a parallel corridor on the east side of the Project Corridor and I-80, connecting back to the Project Corridor via San Pablo Dam Road. However, this includes biking through a congested corridor and the I-80 interchange. North of San Pablo Dam Road, there is not a viable alternative to travel on San Pablo Avenue due to the limited connectivity of the roadway network. Through El Cerrito, the Ohlone Greenway is a near-by parallel facility that serves bicyclists of all ages and abilities. Through Albany, the Ohlone Greenway slowly shift to the east of the Project Corridor; however, it still functions as a parallel route. Bicycle boulevards on Kains Avenue (east side) and Adams Street (east side) provide parallel routes. Adams Street connects to the Buchanan Street path, which in turn connects to the two-way separated bikeway on San Pablo Avenue south of Buchanan Street.

4.1.2.2 Central Corridor

This segment provides substantial opportunities for parallel bicycle facilities, both to the east and west of the Project. In North Berkeley, the Ohlone Greenway shifts further east from the Project Corridor to serve Downtown. However, the West Street path splits off to provide a connection just east of San Pablo Avenue. This is proposed to continue as the Bonar Street/Mabel Street bicycle boulevard. To the west, 9th Street provides an existing bicycle boulevard alternative starting between Gilman Street and the Emeryville Greenway. The Greenway continues onto the Horton Avenue bicycle boulevard via 59th Street.

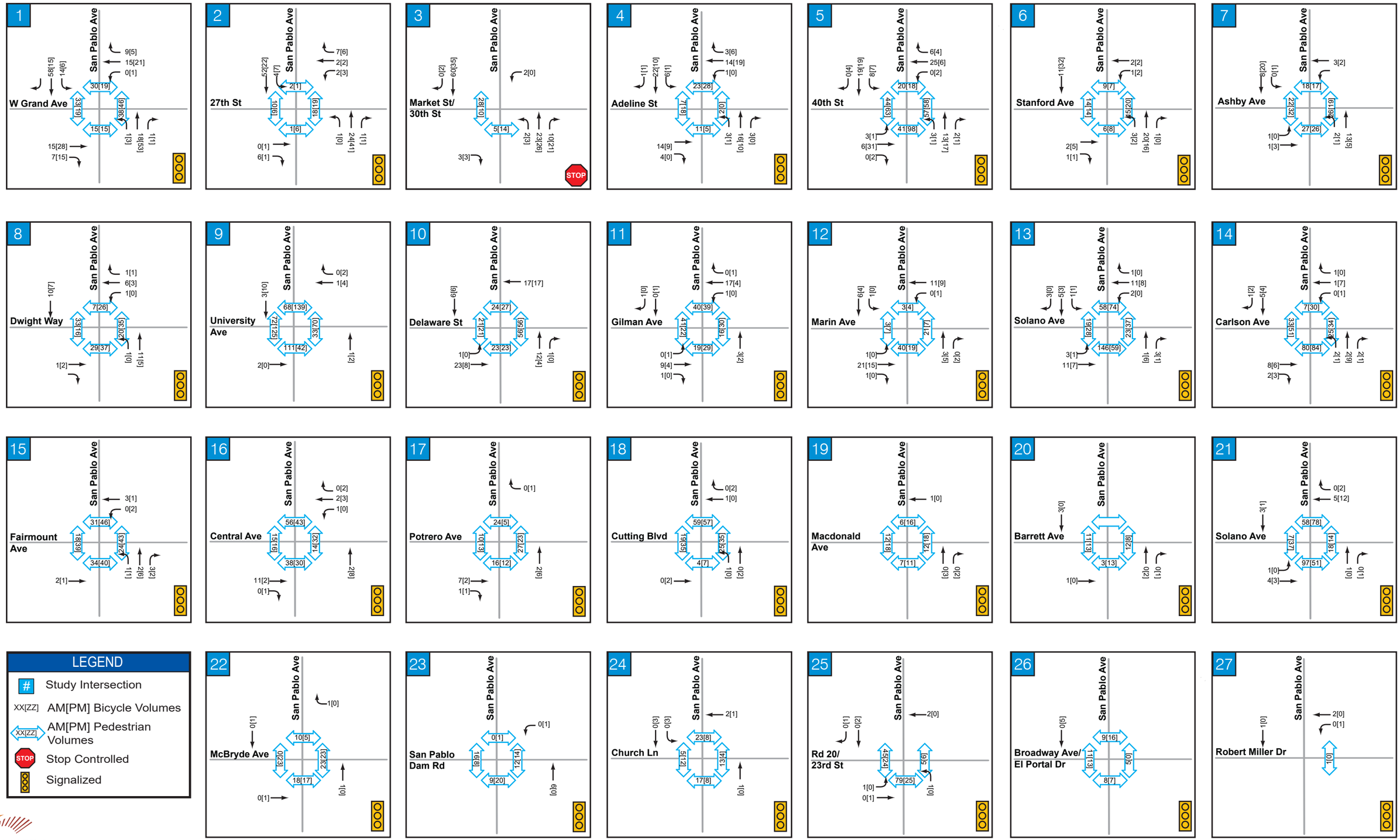
San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Freeways
- Water
- Parks/Open Space

ALAMEDA County Transportation Commission

Figure 4-2.1: San Pablo Avenue Intersection Key for Pedestrian and Bicycle Volume Counts



ALAMEDA County Transportation Commission

Figure 4-2.2: Existing Weekday Peak Period Pedestrian and Bicycle Volumes

4.1.2.3 Southern Corridor

Through Emeryville, the Horton Avenue bicycle boulevard and Adeline Street bicycle lanes provide parallel routes. While these streets continue into Oakland, the bikeways diverge from the Project, as the street grid of Oakland is not oriented to San Pablo Avenue. As a result, bicyclists need to travel further from the corridor to reach the same destinations. For example, the Horton Avenue/Mandela Parkway corridor provides a good north-south connection, but this takes bicyclists substantially further west of their way for destinations in Uptown or Downtown Oakland, for example. Likewise, Market Street to the east is another alternative, but also requires east-west travel on West MacArthur Boulevard or 40th Street to connect and is further from the corridor.

4.1.3 BICYCLIST COMFORT

Bicycle comfort is key measurement of whether the street environment makes people feel safe biking. Generally bicycle comfort metrics are designed to measure whether a street feels safe regardless of age or bicycling ability. The level of bikeway separation and protection for traffic and speed of prevailing traffic and are key variables for measuring bicyclist comfort and were used to assess existing bicyclist comfort on San Pablo Avenue.

4.1.3.1 Methodology

The Mekuria, Furth, and Nixon's 2012 *Low Stress Bicycling and Network Connectivity* report (Transportation Research Board Annual Compendium of Papers, 2016) define a Level of Traffic Stress (LTS) methodology for assessing bicyclist comfort based on roadway characteristics. The report takes a practical approach to defining and describing user tolerance along a given bikeway, balancing typically available data against a "weakest link" methodology informed by sound engineering judgment. Stress factors vary based on the type of bikeway that is being assessed. A score of 1 through 4 is assigned. **Table 4-1** presents the significance of each of the four scores.

The methodologies for bicycle lanes alongside parking lanes and for bicycle routes are presented in **Table 4-2** and **Table 4-3.** For the purpose of this analysis, the corridor was divided into eighteen segments and the prevailing conditions (i.e. the most common condition on San Pablo Avenue) was evaluated for each segment in both the northbound and southbound directions. The Consultant Team, in coordination with Alameda CTC staff, identified the 18 segments to perform the bicycle and pedestrian comfort evaluation along San Pablo Avenue based on a review of cross-sectional configurations and measurements for the Project; all 18 segments were chosen as the cross-sections are similar within the segment limits for the purposes of analysis.

TABLE 4-1: LEVEL OF TRAFFIC STRESS SCORE SIGNIFICANCE	
LTS 1	Presenting little traffic stress and demanding little attention from cyclists, and attractive enough for a relaxing bicycle ride. Suitable for almost all cyclists, including children trained to safely cross intersections. On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a slow traffic stream with no more than one lane per direction, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where cyclists ride alongside a parking lane, they have ample operating space outside the zone into which car doors are opened. Intersections are easy to approach and cross.
LTS 2	Presenting little traffic stress and therefore suitable to most adult cyclists but demanding more attention than might be expected from children. On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a well-confined traffic stream with adequate clearance from a parking lane, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where a bicycle lane lies between a through lane and a right-turn lane, it is configured to give cyclists unambiguous priority where cars cross the bicycle lane and to keep car speed in the right-turn lane comparable to bicycling speeds. Crossings are not difficult for most adults.
LTS 3	More traffic stress than LTS 2, yet markedly less than the stress of integrating with multilane traffic, and therefore welcome to many people currently riding bikes in American cities. Offering cyclists either an exclusive riding zone (lane) next to moderate-speed traffic or shared lanes on streets that are not multilane and have moderately low speed. Crossings may be longer or across higher-speed roads than allowed by LTS 2, but are still considered acceptably safe to most adult pedestrians.
LTS 4	A level of stress beyond LTS3.

TABLE 4-2: LEVEL OF TRAFFIC STRESS METHODOLOGY FOR BICYCLE LANES ALONGSIDE A PARKING LANE				
	LTS =>1	LTS =>2	LTS =>3	LTS =>4
Street width(through lanes per direction)	1	(no effect)	2 or more	(no effect)
Sum of bicycle lane and parking lane width (includes marked buffer and paved gutter)	15 ft. or more	14 or 14.5 ft[a]	13.5 ft. or less (no effect)	(no effect)
Speed limit or prevailing speed	25 mph or less	30 mph	35 mph	40 mph or more
Bicycle lane blockage (typically applies in commercial areas)	rare	(no effect)	Frequent	(no effect)

Note: (no effect) = factor does not trigger an increase to this level of traffic stress.

a If speed limit < 25 mph or Class = residential, then any width is acceptable for LTS 2.

TABLE 4-3: LEVEL OF TRAFFIC STRESS METHODOLOGY IN MIXED TRAFFIC			
	Street Width[1]		
	2-3 Lanes	4-5 Lanes	6+ Lanes
Speed Limit Up to 25 mph	LTS 1[2] or 2[2]	LTS 3	LTS 4
30 mph	LTS 2[2] or 3[2]	LTS 4	LTS 4
35+ mph	LTS 4	LTS 4	LTS 4

Note:

1. For mixed traffic, the LTS methodology sums the total number of travel lanes (i.e. both directions of travel).

2. Use lower value for streets without marked centerlines or classified as residential and with fewer than 3 lanes; use higher value otherwise.

4.1.3.2 Project Results

Table 4-4 presents the level of traffic stress analysis for bicyclists, the analysis worksheets are presented in **Appendix C**. As a result of the shared lane condition that is predominate for most of the corridor, San Pablo Avenue is considered a very high traffic stress corridor for bicyclists, receiving a typical score of LTS 4. The factors driving this are speed and the number of travel lanes. Near Downtown Oakland, bicycle lanes designate dedicated space for bicyclists, which makes a more comfortable environment for bicyclists, particularly when adjacent to only one travel lane. However,

TABLE 4-4: LEVEL OF TRAFFIC STRESS BICYCLE COMFORT ANALYSIS					
ID	Jurisdiction	South Limit	North Limit	LTS*	
				NB	SB
1	Oakland	16th Street	19th Street	2	2
2	Oakland	19th Street	20th Street	3	3
3	Oakland	20th Street	W Grand	3	3
4	Oakland	W Grand	32nd Street	4	4
5	Oakland	32nd Street	36th Street	4	4
6	Oakland, Emeryville	36th Street /I-580 Overpass	Park Avenue	4	4
7	Emeryville	Park Avenue	53rd Street	4	4
8	Emeryville, Oakland, Berkeley	53rd Street	Ashby Avenue	4	4
9	Berkeley	Ashby Avenue	University Avenue	4	4
10	Berkeley	University Avenue	Harrison Street	4	4
11[1]	Berkeley, Albany	Harrison Street	Brighton Avenue	4	4
12	Albany, El Cerrito	Brighton Avenue	Hill Street	4	4
13	El Cerrito	Hill Street	Knott Street	4	4
14	El Cerrito, Richmond	Knott Street	Nevin Avenue	4	4
15	Richmond	Nevin Avenue	Rheem Avenue	4	4
16	Richmond, San Pablo	Rheem Avenue	Road 20	4	4
17	San Pablo	Road 20	Rivers Street	4	4
18	San Pablo, Richmond	Rivers Street	Hilltop Parkway	4	4

Notes:

1. Although a two-way Class IV separated bikeway was recently implemented between Buchanan Street and Dartmouth Street, the prevailing condition on the segment between Harrison Street and Brighton Avenue is a Class bicycle route, in which bicyclist and drivers shared a travel lane. The LTS score is based on the prevailing condition along a study segment.

Source: Fehr & Peers, November 2017.

the bicycle lanes with adjacent parking are narrow north of 19th Street, which lowers the comfort score. When combined width of the bicycle lane and parking area are narrow, much of the bicycle lane becomes an effective "door zone" area, which is a stressful condition for bicyclists and may force them to ride closer to moving vehicles in the travel lane. As a result, the blocks with narrow bicycle lanes receive an LTS 3 score. The two-way separated bikeway in Albany is not highlighted in the table below, as the prevailing condition on the segment between Harrison Street and Brighton Avenue (segment #11) is a bicycle route, in which bicyclist and drivers share a travel lane. This reflects that the separated bikeway may increase comfort substantially for those with short trips on San Pablo Avenue in the vicinity of those improvements. Because the Ohlone Greenway is a parallel facility in this area, it may even serve longer trips in the Study Area to these blocks of San Pablo Avenue. However, it has limited impact for those with destinations elsewhere on San Pablo Avenue.

The 18 segments discussed in this chapter were identified based on a review of cross-sectional configurations and measurements along the corridor; all 18 segments were chosen as the cross-sections are similar within the segment limits for the purposes of analysis.

4.1.3.3 Study Area LTS

Parallel routes on the corridor vary substantially in terms of level of traffic stress for people biking. Below are the common LTS considerations for the types of parallel bicycle facilities present in the Study Area.

Class 1 Path: Paths have an LTS score of 1, indicating that they are great facilities for people of all ages and abilities. Where the Ohlone Greenway functions as a true parallel route, this is a low-stress bikeway that serves a wide range of people biking. Path crossings are a common source of stress for bicyclists, particularly at locations without enhanced crossings, limited sight distance, and/or crossings of roadways with high speed and/or multiple lanes of traffic. As the Ohlone Greenway typically crosses uncontrolled 25MPH two-lane streets, the crossing are considered low-stress. Major streets typically have signalized crossings. However, many jurisdictions have further trail crossing enhancements proposed in their active transportation master plans.

Class II Bicycle Lanes: LTS for bicycle lanes varies widely based primarily on speed, number of travel lanes, and width of the bicycle facility. Bicycle lanes on parallel routes are a common facility type in Oakland, such as Mandela Parkway (LTS 3) and portions of portions of Market Street (LTS 2). At intersections, the LTS methodology calculates stress where auxiliary lanes, such as right-turn lanes, are added. Right-turns are not typically present the Oakland parallel routes. However, Oakland's standard at right-turn pockets is to provide pocket bike lanes. That configuration is LTS 2 assuming a short turn pocket and 15 MPH or less turning speeds. Otherwise, the LTS score is assumed to be consistent with the segment

Class III Bicycle Boulevards: Bicycle boulevards are generally considered to be LTS 1, indicating that they are great facilities for people of all ages and abilities. However, it is important to note that a limitation of the LTS methodology is that it does not consider speeds below 25MPH or average daily traffic volumes (ADT), which are important variables for more accurately understanding stress level on residential streets. The National Association of Traffic Officials' (NACTO's) *Designing for All Ages and Abilities* best practice sets an ADT threshold of 1,500 for bicycle boulevard and less than 25MPH 95th percentile speeds for truly creating a low stress bicycle boulevard. ADT and speeds should be considered when determining how well bicycle boulevards serve as a low-stress alternative to San Pablo Avenue. This is particularly important, as this a common parallel facility type in Albany, Berkeley, and Emeryville. As described in the barriers section in 4.1.2, bicycle boulevard crossings are a common form of traffic stress and can reduce its effectiveness in serving all ages and abilities. Using the LTS uncontrolled crossing methodology, many of the crossing of two-lane 30MPH collectors, for example, would be LTS 1; however, in practice, these can be much more stressful for bikes, with limited gaps in traffics and other factors that can make it feel difficult to cross. Similarly, San Pablo Avenue can be a barrier for access from bicycle boulevard with uncontrolled crossings that can feel stressful. These receive an LTS 2 score (based on 30MPH speed, presence of refuge, and four to five lanes of traffic); however, these can feel much more stressful in practice given high ADT, limited gaps in traffic, and not a true median refuge for bicyclists.

Class IV Separated Bikeways: Class IV separated bikeways have an LTS score of 1, indicating that they are great facilities for people of all ages and abilities. The primary Class IV facility within the Corridor is the Telegraph Avenue parking-protected bikeway between 29th and 20th Streets in Oakland. Intersections and mid-block driveways serve as the primary sources of traffic stress for bicyclists on this facility. Conflicts with buses was a point of stress for bicyclists, but recently installed bus islands mitigate this issue by separating bus operations from the bikeway. Negligent or uneducated motorists have been observed parking in the bikeway or using it as a through lane when turning right onto Telegraph Avenue. Education and enforcement have mitigated this issue slightly, but it continues to be a source of stress for riders. A two-way Class IV separated bikeway was also recently constructed along a 0.2-mile stretch of San Pablo Avenue in Albany. Similar to Telegraph Avenue, conflict points include an intersection and driveway. While both the Telegraph Avenue and San Pablo Avenue Class IV facilities have an LTS of 1, they are relatively small sections of the bicycle network and provide limited connectivity to other low-stress bicycle facilities.

No Designated/Dedicated Bikeway: The LTS methodology for streets with no dedicated or designated bikeway is the same as that for mixed-flow travel (i.e. Class III bicycle boulevard and bicycle routes). The primary drivers of comfort are speed and number of travel lanes. These conditions vary widely across the corridor; though many are residential streets.

4.2 PEDESTRIAN NETWORK

Pedestrian emphasis areas and a review of pedestrian comfort along the San Pablo Avenue Corridor are presented below.

4.2.1 AREAS WITH PEDESTRIAN EMPHASIS

This subsection identifies segments of Study Area that pass through areas with moderate or significant pedestrian emphasis and therefore warrant the potential designation of pedestrian modal preference. This designation will co-inform the development of scenarios for long- and near-term transportation and placemaking improvements, with an emphasis on pedestrian related improvements, including access to transit.

4.2.1.1 Methodology

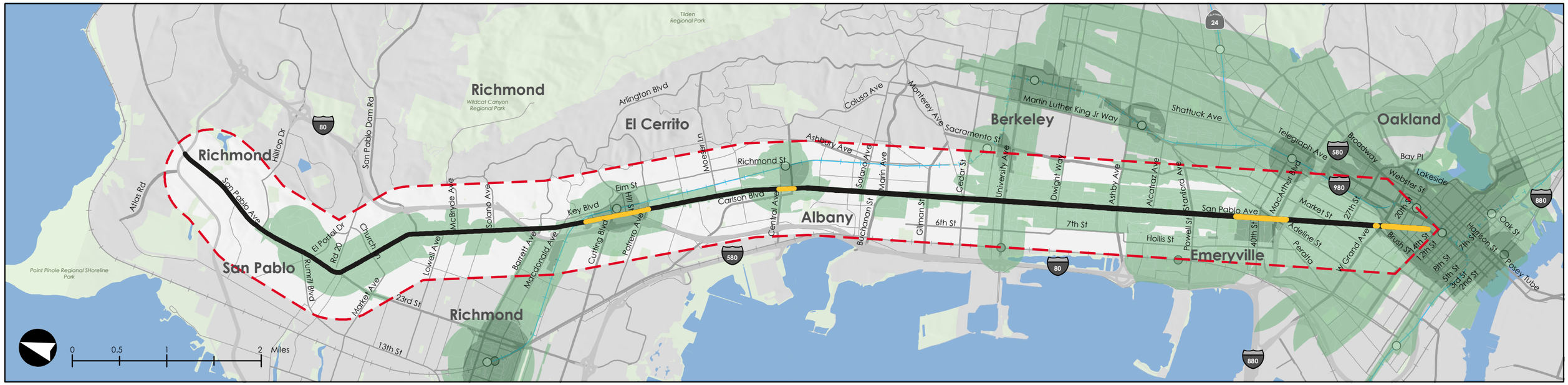
The mapping of areas with pedestrian emphasis along the San Pablo Avenue Corridor follows the same methodology that was employed for the MAP[2]. The only adjustments made to the underlying data for Alameda County is an update of the geography of PDA boundaries that have changed since the MAP mapping was developed and the addition of Activity Centers (also see Section 10.1) based on the most recent jurisdictional land use, planning, and zoning documents. The mapping for Contra Costa County is based on the same approach.

The pedestrian emphasis mapping results distinguish segments of San Pablo Avenue that pass through areas that produce a moderate or significant "pedestrian emphasis" score under the scoring methodology developed for the MAP.

4.2.1.2 Corridor Segments passing Through Areas of Pedestrian Emphasis

Figure 4-3 illustrates which areas along Study Area are classified as having a moderate and significant pedestrian emphasis based on the scoring criteria. Some smaller commercial nodes do not achieve the level of moderate pedestrian emphasis. Such is the case with the commercial node at University Avenue/San Pablo Avenue in the City of Berkeley. This area narrowly misses the threshold for moderate pedestrian emphasis because Berkeley's General Plan identifies the whole of the San Pablo Avenue PDA as a relatively low-scoring Mixed Use Corridor and without assigning zoning categories that would distinguish the area around the intersection as having an intensity that is higher than in other areas that fall within the PDA. However, nodes such as the University Avenue/San Pablo Avenue will still be taken into account as important for pedestrian activity based on the land use frontage mapping and a general understanding of existing conditions along San Pablo Avenue.

[2] *Final Countywide Multimodal Arterial Plan*, Alameda County Transportation Commission, 2016; Appendix 1.3.1 Typology and Modal Priority Memo.



San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Pedestrian Emphasis Areas*

- Moderate Pedestrian Emphasis Area
- Significant Pedestrian Emphasis Area
- Segment of San Pablo Avenue fronted by Significant Pedestrian Emphasis Area
- Study Area Boundary

*Pedestrian Emphasis scores calculated based on proximity to commercial districts, transit routes and stations, and PDA's.

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Figure 4-3 Areas of Pedestrian Emphasis

November 17, 2017

The map further highlights segments of San Pablo Avenue that traverse areas of significant pedestrian emphasis. The following San Pablo Avenue segments are considered to be in areas of significant pedestrian emphasis:

- West Grand Avenue to the southern end of San Pablo Avenue in Oakland;
- 53rd Street to I-580 in Emeryville;
- South of Carlson Boulevard to Central Avenue in El Cerrito (in the vicinity of the El Cerrito Plaza BART Station); and
- Potrero Avenue to Conlon Avenue in El Cerrito (in the vicinity of the El Cerrito Del Norte BART Station).

As expected, the areas associated with a significant pedestrian emphasis score are segments of the San Pablo Avenue located in or near Downtown Oakland, commercial areas in Emeryville, and in the vicinity of two BART stations in El Cerrito. Commercial nodes and segments along San Pablo Avenue in Berkeley do not rise to the level of significant pedestrian emphasis because of the Mixed Use Corridor designation of the PDA area. Under the MAP's mapping methodology, a Mixed Use Corridor designation scores significantly lower compared to a City Center PDA designation, such as for the PDA in the City of Emeryville.[3] The San Pablo Avenue segments associated with a moderate pedestrian emphasis score are in areas with pedestrian-oriented main street environments, larger commercial districts or smaller retail nodes. As shown on Figure 4-3, the majority of the San Pablo Avenue Corridor traverses moderate pedestrian emphasis areas.

4.2.1.3 Pedestrian Crossing Volumes

AM and PM peak hour pedestrian volumes at crosswalks (based on counts collected in 2016) are presented in Figure 4-2 for key signalized intersections along San Pablo Avenue. The following intersections were observed to have more than 100 pedestrian crossings during the AM and/or PM peak hour:

- San Pablo Avenue/Grand Avenue (Oakland)
- San Pablo Avenue/40th Street (Emeryville)
- San Pablo Avenue/Dwight Way (Berkeley)
- San Pablo Avenue/University Avenue (Berkeley)
- San Pablo Avenue/Delaware Street (Berkeley)
- San Pablo Avenue/Gilman Avenue (Berkeley)
- San Pablo Avenue/Solano Avenue (Albany)
- San Pablo Avenue/Carlson Avenue (El Cerrito)
- San Pablo Avenue/Fairmount Avenue (El Cerrito)
- San Pablo Avenue/Central Avenue (El Cerrito)

[3] See Appendix C for an overview of the MAP scoring thresholds and ranges.

- San Pablo Avenue/Cutting Boulevard (El Cerrito)
- San Pablo Avenue/Solano Avenue (Richmond)
- San Pablo Avenue/23rd Street/Road 20 (San Pablo)

Note that the pedestrian emphasis methodology described above does not incorporate pedestrian volumes into the scoring system. However, all intersections listed above are located in moderate or significant pedestrian emphasis areas.

4.2.2 PEDESTRIAN COMFORT

Pedestrian comfort is important to supporting a walkable, thriving street. Like bicycle comfort, pedestrian comfort is based on a variety of factors, not just one variable. Multiple variables ranging from the quality and presence of sidewalk to the conditions of the adjacent roadway (speed, number of travel lanes, and frequency of trucks) influence comfort. The Streetscore+ methodology incorporates those variables to provide a score for each segment.

4.2.2.1 Methodology

The Pedestrian Streetscore+ has a parallel structure to the Level of Traffic Stress approach for bicyclists, using a 1-4 scale:

- **Streetscore+ 1**: Highly comfortable, pedestrian-friendly, and easily navigable for pedestrians of all ages and abilities, including seniors or school-aged children walking unaccompanied to school. These streets provide an ideal "pedestrian-friendly" environment.
- **Streetscore+ 2**: Generally comfortable for many pedestrians, but parents may not feel comfortable with children walking alone. Seniors may have concerns about the walking environment and take more caution. These streets may be part of a "pedestrian-friendly" environment where it intersects with a more auto-oriented roadway or other environmental constraints.
- **Streetscore+ 3**: Walking is uncomfortable but possible. Minimum sidewalk and crossing facilities may be present, but barriers are present that make the walking experience uninviting and uncomfortable.
- **Streetscore+ 4:** Walking is a barrier and is very uncomfortable or even impossible. Streets have limited or no accommodation for pedestrians and are inhospitable and possibly unsafe environment for pedestrians.

Each variable is scored 1 through 4, with the highest stress (lowest comfort) condition resulting in the composite score. The weakest link approach accounts for the important role of intersections and gaps in the pedestrian environment, parallel to the Mekuria, Furth, and Nixon methodology for Level of Traffic Stress. For the purpose of this analysis, the corridor was divided into 18 segments and the prevailing conditions (i.e. the most common condition on San Pablo Avenue) was evaluated for each segment on both the east and west sides of the street.

Pedestrian Streetscore+ link criteria are presented in **Table 4-5**.

TABLE 4-5: STREETSCORE+ CRITERIA SIDEWALKS IN URBANIZED AREAS				
Criteria	Streetscore+ 1	Streetscore+ 2	Streetscore+ 3	Streetscore+ 4
Usable Sidewalk Width	>=8 feet	7 to 6 feet	<6 feet	No Sidewalk
Sidewalk Quality	Even, Smooth Surface	(no effect)	(no effect)	Cracks, Failing Pavement
Sidewalk Accessibility	Driveway Curb Cuts Out of the Sidewalk Zone	(no effect)	(no effect)	Frequent Driveway Curb Cuts into the Sidewalk Zone
Landscape Buffer and Street Trees	Yes, Continuous	Yes, Discontinuous[1]	No Landscaping	(no effect)
# of Lanes	2-3	4-5	(no effect)	6+
Prevailing Speed	<=25 mph	26- 30 mph	31-35 mph	>=36 mph
Lighting	Pedestrian-Scale	Roadway Lighting	(no effect)	No Lighting[2]
Heavy Vehicle[3]	<=5%	5-8% with no buffer OR >8% with buffer	(no effect)	>8% with no buffer
Crosswalk Frequency[4]	Crosswalks Spaced 400 feet or Less	(no effect)	Crosswalks Spaced > 400 feet	(no effect)

1. Discontinuous is defined as not having a consistent effect on street life. Regularly spaced street trees may still feel like a "continuous" buffer and should receive a score of 1.
2. No lighting also includes ineffective roadway lighting.
3. Consider the percentage of heavy vehicles operating in the curbside travel lane as data is available.
4. In urbanized areas where pedestrians are expected, crosswalk frequency should be taken into consideration where there is demand based on land use and densities. As a general rule of thumb, consider marking a crosswalk if 20 pedestrians in a given hour may cross at that location.

Note: Same as the Mekuria, Furth, and Nixon (2012) methodology, "no effect" signifies that there is no further decrease in comfort for that variable.

4.2.2.2 Project Results

Table 4-6 presents the Streetscore+ comfort analysis for pedestrians, the analysis worksheets are presented in Appendix C. Pedestrian comfort is generally lower in the northern half of the corridor as compared to the southern half, typically receiving a score ranging from 2 to 3. The Streetscore+ 2 sections are primarily in or near Downtown Oakland and the commercial node around 40th Street in Emeryville. Each of

these areas have seen investments in the streetscape to make it a more comfortable environment to walk. For example, the Emeryville portion includes continuous street trees and pedestrian-scale lighting, which provide shade in hot conditions, create a pleasant walking environment, and make pedestrians feel more secure after dark. In Downtown Oakland, sidewalks are wide and some street trees are provided.

In most of the corridor, the Streetscore+ 3 score indicates that there are few amenities and in some cases barriers to walking that make walking feasible but often uncomfortable or unpleasant. In Richmond and San Pablo, this is driven by the high posted speed of the roadway, at 35 mph. On the northern end of the Study Area, there are no sidewalks today (though a project is planned to address this) and a high posted speed limit, yielding a score of 4. In the North & East neighborhoods of Richmond, the Streetscore+ 4 score is driven by the high frequency of driveways in addition and limited crossing opportunities.

Limited crossing opportunities are another primary driver in the lower prevailing score. In many sections, block sizes are long with limited opportunities to cross San Pablo Avenue. Where crossing opportunities are typically less than 400 feet, the segment received Streetscore+ 3. This was a common issue along the San Pablo Avenue segments in Contra Costa County and into Albany and Berkeley.

TABLE 4-6: STREETSCORE+ PEDESTRIAN COMFORT ANALYSIS

ID	Jurisdiction	South Limit	North Limit	Does Segment Traverse Significant Ped Emphasis Area?[1]	Ped Streetscore	
					NB	SB
1	Oakland	16th Street	19th Street	Yes	2	2
2	Oakland	19th Street	20th Street	Yes	2	2
3	Oakland	20th Street	W Grand	Yes	3	3
4	Oakland	W Grand	32nd Street	Yes	2	2
5	Oakland	32nd Street	36th Street	No	3	3
6	Oakland, Emeryville	36th Street /I-580 Overpass	Park Avenue	Yes	2	2
7	Emeryville	Park Avenue	53rd Street	Yes	2	2

TABLE 4-6: STREETSCORE+ PEDESTRIAN COMFORT ANALYSIS

ID	Jurisdiction	South Limit	North Limit	Does Segment Traverse Significant Ped Emphasis Area?[1]	Ped Streetscore	
					NB	SB
8	Emeryville, Oakland, Berkeley	53rd Street	Ashby Avenue	No	2	2
9	Berkeley	Ashby Avenue	University Avenue	No	2	2
10	Berkeley	University Avenue	Harrison Street	No	2	2
11	Berkeley, Albany	Harrison Street	Brighton Avenue	No	3	3
12	Albany, El Cerrito	Brighton Avenue	Hill Street	Yes	3	3
13	El Cerrito	Hill Street	Knott Street	Yes	3	3
14	El Cerrito, Richmond	Knott Street	Nevin Avenue	Yes	3	3
15	Richmond	Nevin Avenue	Rheem Avenue	No	4	4
16	Richmond, San Pablo	Rheem Avenue	Road 20	No	3	3
17	San Pablo	Road 20	Rivers Street	No	3	3
18	San Pablo, Richmond	Rivers Street	Hilltop Parkway	No	4	4

1. Significant Pedestrian Emphasis Areas are mapped on Figure 4-3. Section 4.2.1.1 describes the methodology employed to identify these areas.

4.2.2.3 Study Area Comfort

The Streetscore+ comfort methodology described above is primarily intended as is for commercial corridors. However, many of the same variables influence comfort on residential or industrial streets. As discussed in the bicycle section, parallel roadways are typically local streets. These typically have a narrow sidewalk with roadway lighting at intersections. Depending on the jurisdiction, there may be street trees. In many old residential neighborhoods, sidewalk uplift or landscape growing into the sidewalk area can be common impediments to comfort. This generally true both of parallel routes and side streets accessing the Project.

4.3 KEY FINDINGS

A review of existing bicycle facilities along the Project indicates that the majority of the corridor is considered very high traffic stress for bicyclists. Furthermore, the Project is characterized by a lack of a continuous and connected bicycle network. There is not a continuous parallel roadway to San Pablo Avenue through the Study Area. As a result, parallel bicycle facilities may serve bicycle travel short- to medium- trip length, within one neighborhood or even city, but do not serve longer trips along full length the Project Corridor. There are opportunities for parallel facilities and some existing longer segments of parallel bikeway on most portions of the corridor. However, even those segments include substantial barriers that would need to be improved to create a viable alternative bikeway.

The primary outcome of the pedestrian emphasis mapping is the identification of San Pablo Avenue segments that have need for pedestrian safety and comfort improvements. Pedestrian facilities along the corridor were rated with a Streetscore+ score of 2 or 3 south of Harrison Street in Berkeley, and with Streetscore+ score of 3 or 4 north of Harrison Street. The existing evaluation indicates that San Pablo Avenue segments in Contra Costa County have a greater need for pedestrian infrastructure improvements than segments in Alameda County. Since the majority of transit users along the Project are pedestrians at some point on their trip, improving pedestrian infrastructure will enhance access to transit and support transit riders.

5. AUTOMOBILE & ITS

This chapter provides a summary of the automobile peak hour volumes, peak period speeds, intersection traffic operations and Intelligent Transportation System (ITS) infrastructure along the Project Corridor.

5.1 EXISTING VOLUMES

Bidirectional morning and evening peak hour counts for roadway segments along San Pablo Avenue are summarized in **Figure 5-1**. The roadway segment count data was derived from intersection turning movement counts collected along San Pablo Avenue in November 2016. Vehicular traffic along San Pablo Avenue peaks in the southbound direction during the AM peak hour and in the northbound direction during the PM peak hour on weekdays.

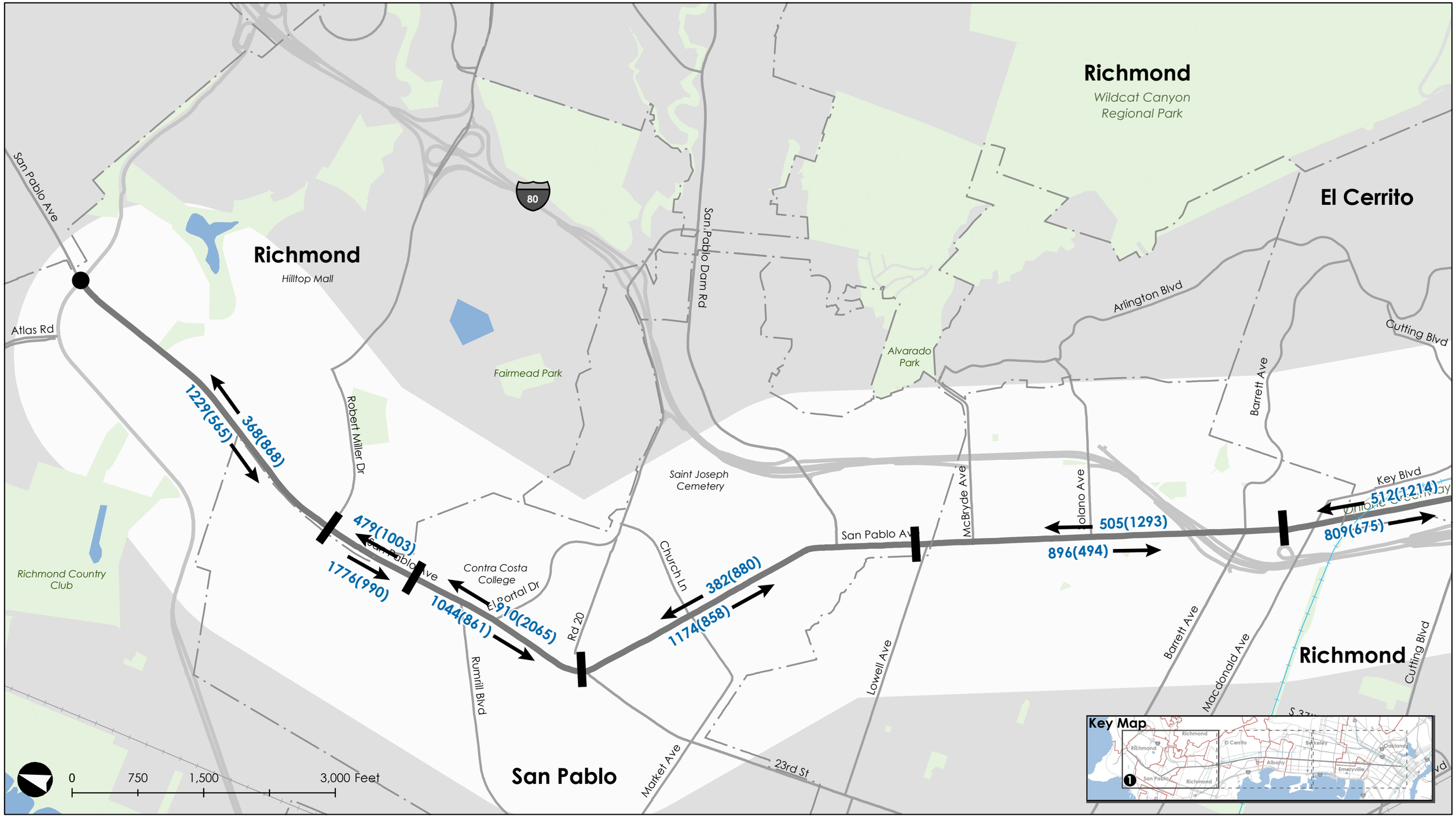
Northbound vehicle volumes are highest from 36th Street to Park Avenue in the City of Emeryville during the AM peak hour (1,017 vehicles) and from Road 20 to River Street in the City of San Pablo during the PM peak hour (2,065 vehicles). Southbound vehicle volumes are highest from Hilltop Drive to Rivers Street in the City of San Pablo during the AM peak hour (1,776 vehicles) and from 53rd Street to Park Avenue in the City of Emeryville during the PM peak hour (1,216 vehicles).

5.2 AUTO TRAVEL SPEED AND VARIABILITY

Auto travel speed and variability was evaluated for San Pablo Avenue and key parallel and cross-streets during the weekday AM, midday, and PM peak periods based on readily-available data provided from the INRIX database. INRIX data is gathered from a variety of sources, including in-vehicle GPS systems, mobile smart phones, and roadway sensors. The Consultant Team evaluated average peak period travel speeds along San Pablo Avenue for typical weekday conditions (e.g., Tuesday, Wednesday, and Thursday) utilizing data from the months of April and May 2017. A summary of auto speed and variability is presented below.

5.2.1 AUTO TRAVEL SPEED AND TRAVEL TIME

In reviewing the weekday AM, midday, and PM peak period travel speed data, speeds tend to be lower during the PM peak period. The average PM peak period travel speed between 4:00 and 6:00 PM is presented on **Figure 5-2**; figures showing the average AM (7:00 – 9:00 AM) and midday (11:00 AM – 1:00 PM) peak period travel speeds are presented in **Appendix D**. Peak period data is also summarized in a chart on **Graph 5-1** for northbound San Pablo Avenue and on **Graph 5-2** for southbound San Pablo Avenue. Average speed data presented in this chapter accounts for intersection delay. The majority of San Pablo Avenue has a posted speed limit of 30 mph, except the following segments:



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space
- ##(##) AM(PM) Segment Volumes
- Roadway Cross Section Change

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San Pablo Avenue Corridor Project

Figure 5-1.1: Existing Segment Vehicle Volumes
San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space
- ##(##) AM(PM) Segment Volumes
- Roadway Cross Section Change

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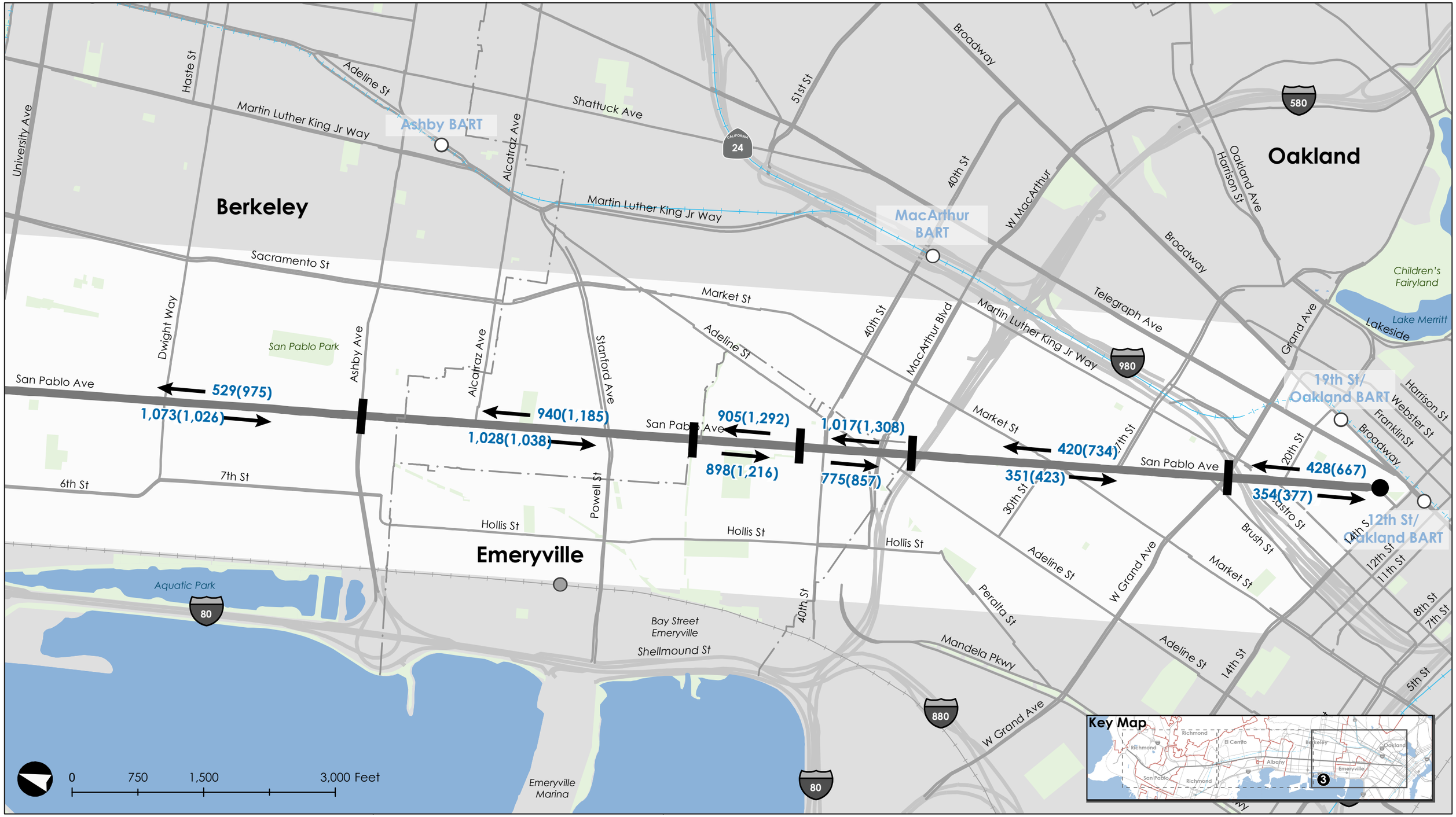
Figure 5-1.2: Existing Segment Vehicle Volumes
San Pablo Corridor between Cutting Boulevard and University Avenue



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space
- ##(##) AM(PM) Segment Volumes
- Roadway Cross Section Change

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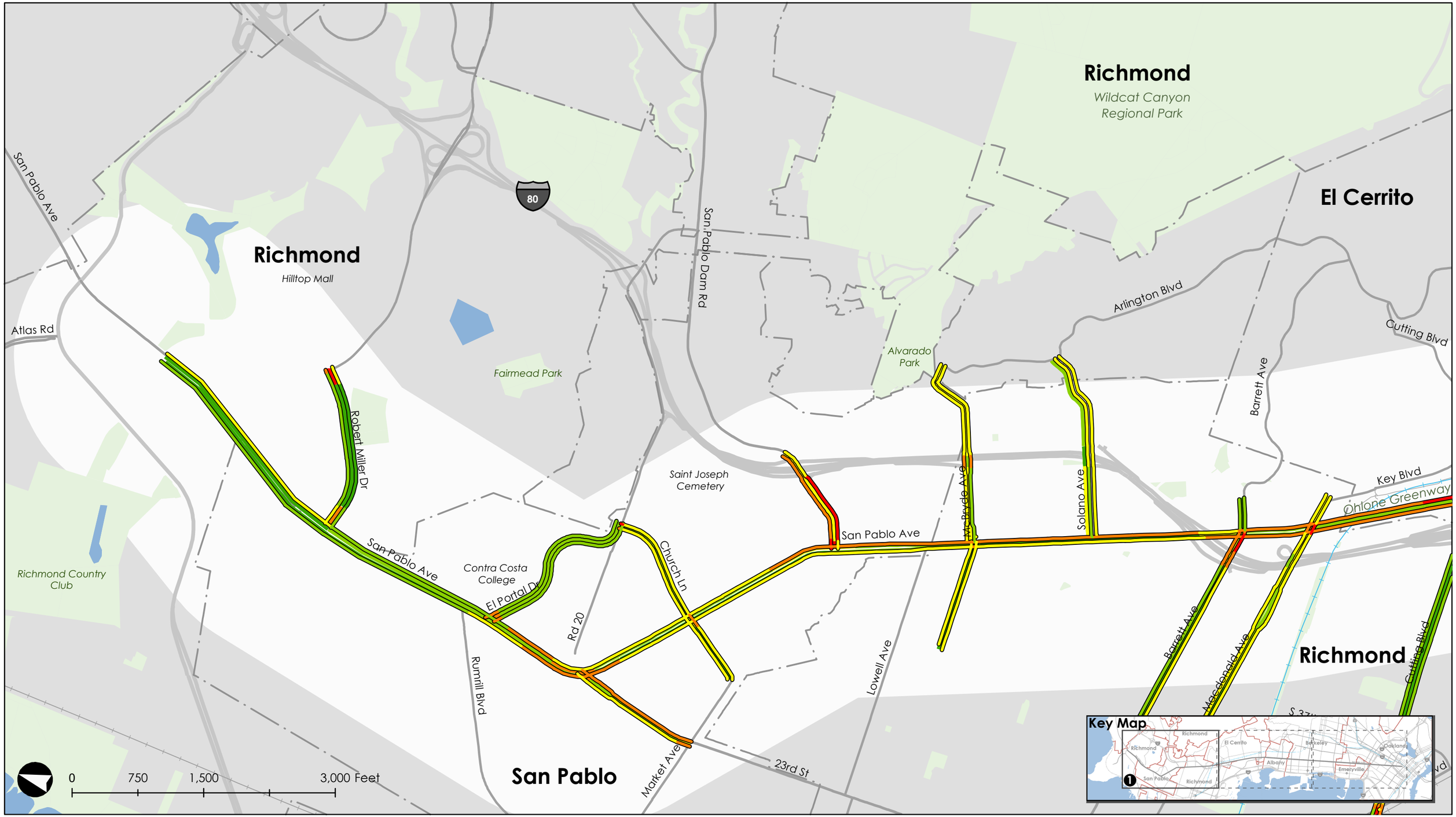
San Pablo Avenue Corridor Project

Figure 5-1.3: Existing Segment Vehicle Volumes
San Pablo Corridor between University Avenue and Frank Ogawa Plaza



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Average Travel Speed

- < 10 mph
- 11 - 15 mph
- 16 - 20 mph
- 21 - 30 mph
- > 30 mph

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San Pablo Avenue Corridor Project

Figure 5-2.1

Existing PM Peak Period (4:00 - 6:00 PM) Auto Travel Speed

San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Average Travel Speed

- < 10 mph
- 11 - 15 mph
- 16 - 20 mph
- 21 - 30 mph
- > 30 mph

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San Pablo Avenue Corridor Project

Figure 5-2.2

Existing PM Peak Period (4:00 - 6:00 PM) Auto Travel Speed

San Pablo Corridor between Cutting Boulevard and University Avenue

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Average Travel Speed

- < 10 mph
- 11 - 15 mph
- 16 - 20 mph
- 21 - 30 mph
- > 30 mph

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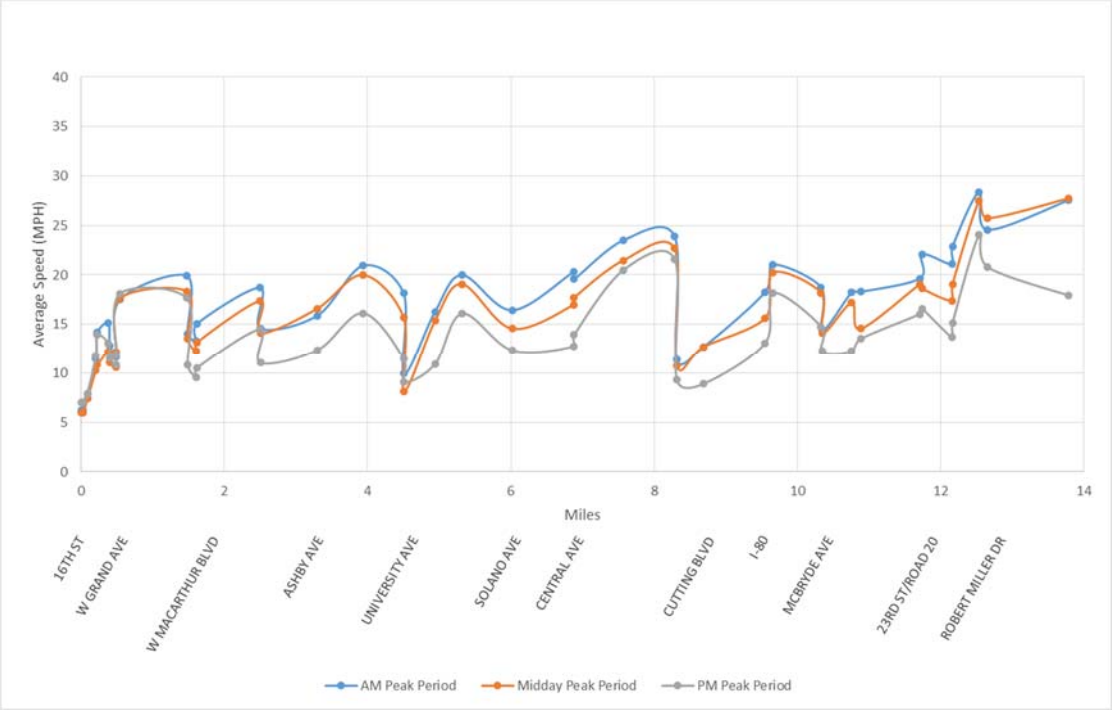
San Pablo Avenue Corridor Project

Figure 5-2.3

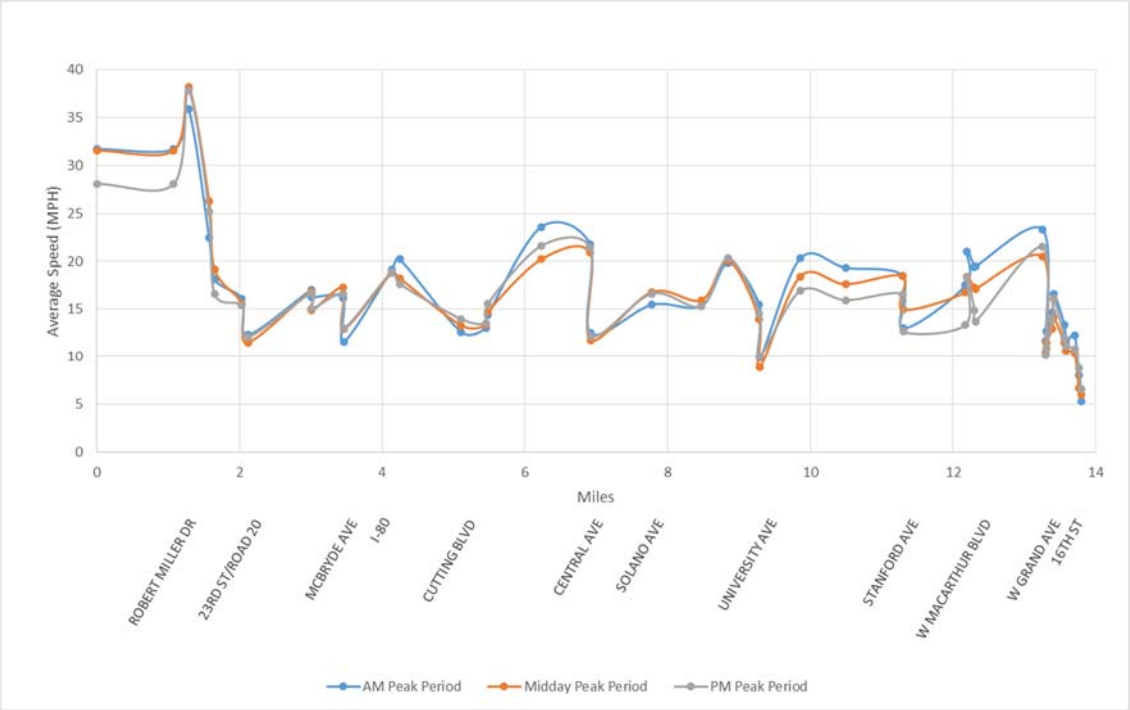
Existing PM Peak Period (4:00 - 6:00 PM) Auto Travel Speed

San Pablo Corridor between University Avenue and Frank Ogawa Plaza

Graph 5-1. Existing Peak Period Travel Speed – Northbound San Pablo Avenue



Graph 5-2. Existing Peak Period Travel Speed – Southbound San Pablo Avenue



- Segments in school zones have a 25 mph posted speed limit
- Segments south of I-980 near downtown Oakland have a 25 mph posted speed limit
- Segments within the City of San Pablo have a 35 mph posted speed limit
- The segments north of Lancaster Drive (City of Richmond) have a posted speed limit ranging between 40 – 45 mph

As shown on the figures and charts, travel speed varies substantially along the San Pablo Avenue Corridor. Travel speed tends to be lower during the PM peak period compared to the AM and midday peak periods. San Pablo Avenue north of El Portal Drive (San Pablo and Richmond) experiences the highest travel speeds, with average speeds often greater than 30 mph during the peak periods. Although some segments experience travel speeds greater than 30 mph, average peak period travel speed is generally lower than the posted speed limit on San Pablo Avenue. Several segments of the corridor experience low travel speeds, the following segments typically experience travel speeds lower than 15 mph:

- Southbound San Pablo Avenue between El Portal Drive and 23rd Street during the AM, midday and PM peak periods
- Southbound San Pablo Avenue between Barrett Avenue and Potrero Avenue during the AM, midday and PM peak periods
- Northbound San Pablo Avenue between Potrero Avenue and San Pablo Dam Road during the PM peak period
- Northbound and Southbound San Pablo Avenue in the vicinity of the El Cerrito Del Norte BART Station during the AM, midday and PM peak periods
- Southbound San Pablo Avenue between Cedar Street and University Avenue during the midday and PM peak periods
- Northbound San Pablo Avenue between MacArthur Boulevard and Ashby Avenue during the PM peak period
- Northbound San Pablo Avenue between Dwight Way and Cedar Street during the PM peak period
- Northbound San Pablo Avenue between Gilman Street and Central Avenue during the PM peak period
- Northbound and Southbound San Pablo Avenue south of West Grand Avenue during the AM, midday and PM peak periods

The following key cross-streets also experience travel speeds lower than 15 mph along their approaches to San Pablo Avenue:

- Central Avenue during the AM, midday and PM peak periods
- Buchanan Street during the AM, midday and PM peak periods
- Gilman Street during the AM, midday and PM peak periods
- University Avenue during the midday and PM peak periods

- Ashby Avenue during the AM, midday and PM peak periods
- Shellmound Street during the AM, midday and PM peak periods
- West Grand Avenue during the AM, midday and PM peak periods

In reviewing the speed data, peak period speeds along San Pablo Avenue generally tend to be lower along segments that approach major arterials that provide direct access to I-80. This confirms that San Pablo Avenue is a key arterial that not only serves as a parallel route to I-80 but also facilitates access to I-80.

In addition, average AM, midday, and PM peak period travel time along San Pablo Avenue between 16th Street in Oakland and Hilltop Drive in Richmond is summarized in **Table 5-1.** As shown in Table 5-1, travel time along both directions is highest during the PM peak period and lowest during the AM peak period.

TABLE 5-1: AVERAGE WEEKDAY TRAVEL TIMES ON SAN PABLO AVENUE

Direction	AM Peak		Midday Peak		PM Peak	
	Travel Time (hr:min)	Average Speed (mph)	Travel Time (hr:min)	Average Speed (mph)	Travel Time (hr:min)	Average Speed (mph)
Northbound	0:44	19	0:47	18	0:58	14
Southbound	0:46	18	0:47	18	0:48	17

5.2.1.1 Historical Auto Travel Speed Data

Supplemental average PM peak period auto travel speed data ranging between 1997 and 2016 for select segments is summarized for northbound San Pablo Avenue in **Table 5-2** and for southbound San Pablo Avenue in **Table 5-3**; the historical data was provided by Alameda CTC and CCTA, and accounts for intersection delay. As shown in the tables below, average PM peak period auto travel speed has fluctuated substantially throughout the years.

TABLE 5-2: HISTORICAL PM PEAK PERIOD AUTO TRAVEL SPEED ON NORTHBOUND SAN PABLO AVENUE

Segment		'97	'98	'00	'02	'04	'06	'08	'10	'12	'14	'16
From	To											
35th	Park	19	13	20	14	15	12	15	18	12	10	25
Park	53rd	22	20	25	30	23	21	25	29	23	28	19
53rd	Stanford	11	10	15	10	12	14	21	22	15	23	7
Stanford	Ashby	17	11	15	26	15	13	13	19	15	13	15
Ashby	Dwight	21	16	22	20	21	17	21	19	15	14	13
Dwight	Allston	21	16	22	20	21	17	24	25	24	16	19
Allston	University	9	3	5	11	8	6	9	6	5	12	13
University	Gilman	16	14	19	17	16	16	17	20	20	12	13
Gilman	Marin	17	12	21	22	23	16	10	16	13	15	17
Marin	Washington	27	15	20	22	21	12	6	24	24	12	11
Washington	Carlson	23	22	25	18	14	20	17	17	20	17	7
Central	Moeser	--	--	--	--	--	--	--	25	26	22	20
Moeser	Potrero	--	--	--	--	--	--	--	27	28	23	21
Potrero	Cutting	--	--	--	--	--	--	--	20	22	15	9
Cutting	I-80	--	--	--	--	--	--	--	20	21	16	15
I-80	McBryde	--	--	--	--	--	--	--	22	24	17	14
McBryde	San Pablo Dam	--	--	--	--	--	--	--	21	22	17	12
San Pablo Dam	23rd/Rd 20	--	--	--	--	--	--	--	21	23	20	16
23rd/Rd 20	College/ Rumrill	--	--	--	--	--	--	--	21	23	20	14
College/ Rumrill	Robert Miller	--	--	--	--	--	--	--	28	30	25	23

Source: Alameda CTC and CCTA.

TABLE 5-3: HISTORICAL PM PEAK PERIOD AUTO TRAVEL SPEED ON SOUTHBOUND SAN PABLO AVENUE

Segment		'97	'98	'00	'02	'04	'06	'08	'10	'12	'14	'16
From	To											
Robert Miller	College/ Rumrill	--	--	--	--	--	--	--	34	35	28	26
College/ Rumrill	23rd/Rd 20	--	--	--	--	--	--	--	24	25	17	16
23rd/Rd 20	San Pablo Dam	--	--	--	--	--	--	--	21	22	18	17
San Pablo Dam	McBryde	--	--	--	--	--	--	--	23	23	19	16
McBryde	I-80	--	--	--	--	--	--	--	24	25	21	19
I-80	Cutting	--	--	--	--	--	--	--	21	23	17	15
Cutting	Potrero	--	--	--	--	--	--	--	22	23	18	15
Potrero	Moeser	--	--	--	--	--	--	--	27	29	23	22
Moeser	Central	--	--	--	--	--	--	--	25	26	21	22
Carlson	Washington	25	34	34	19	31	27	27	26	24	17	22
Washington	Marin	17	20	15	23	18	14	12	17	15	14	10
Marin	Gilman	18	18	19	25	22	16	16	17	16	15	10
Gilman	University	16	16	20	19	19	14	20	18	16	18	18
University	Allston	14	12	17	11	11	9	16	19	14	14	12
Allston	Dwight	19	18	14	25	17	12	19	18	20	18	21
Dwight	Ashby	19	18	14	25	17	12	14	20	14	13	14
Ashby	Stanford	20	22	20	20	19	17	16	18	17	17	20
Stanford	53rd	23	17	20	25	29	22	26	26	17	18	14
53rd	Park	14	15	18	18	15	14	15	18	18	15	10
Park	35th	15	13	13	12	16	12	13	14	13	10	6

Source: Alameda CTC and CCTA.

5.2.2 AUTO VARIABILITY

The auto travel time variability was measured by taking the standard deviation of travel times for a particular segment and dividing it by the average travel time of that segment based on weekday travel speed data provided by the INRIX database for the months of April and May 2017. This ratio reflects the variability of auto travel time along each segment. The average PM peak period travel time variability between 4:00 and 6:00 PM is presented on **Figure 5-3**; figures showing the average AM (7:00 – 9:00 AM) and midday (11:00 AM – 1:00 PM) peak period travel time variability are presented in Appendix D. Peak period auto variability data is also summarized in a chart on **Graph 5-3** for northbound San Pablo Avenue and on **Graph 5-4** for southbound San Pablo Avenue. Thresholds to determine if auto variability is good or bad are not established. In general, the higher the ratio, the more unreliable the segment is and the more that travel time will vary from day to day.

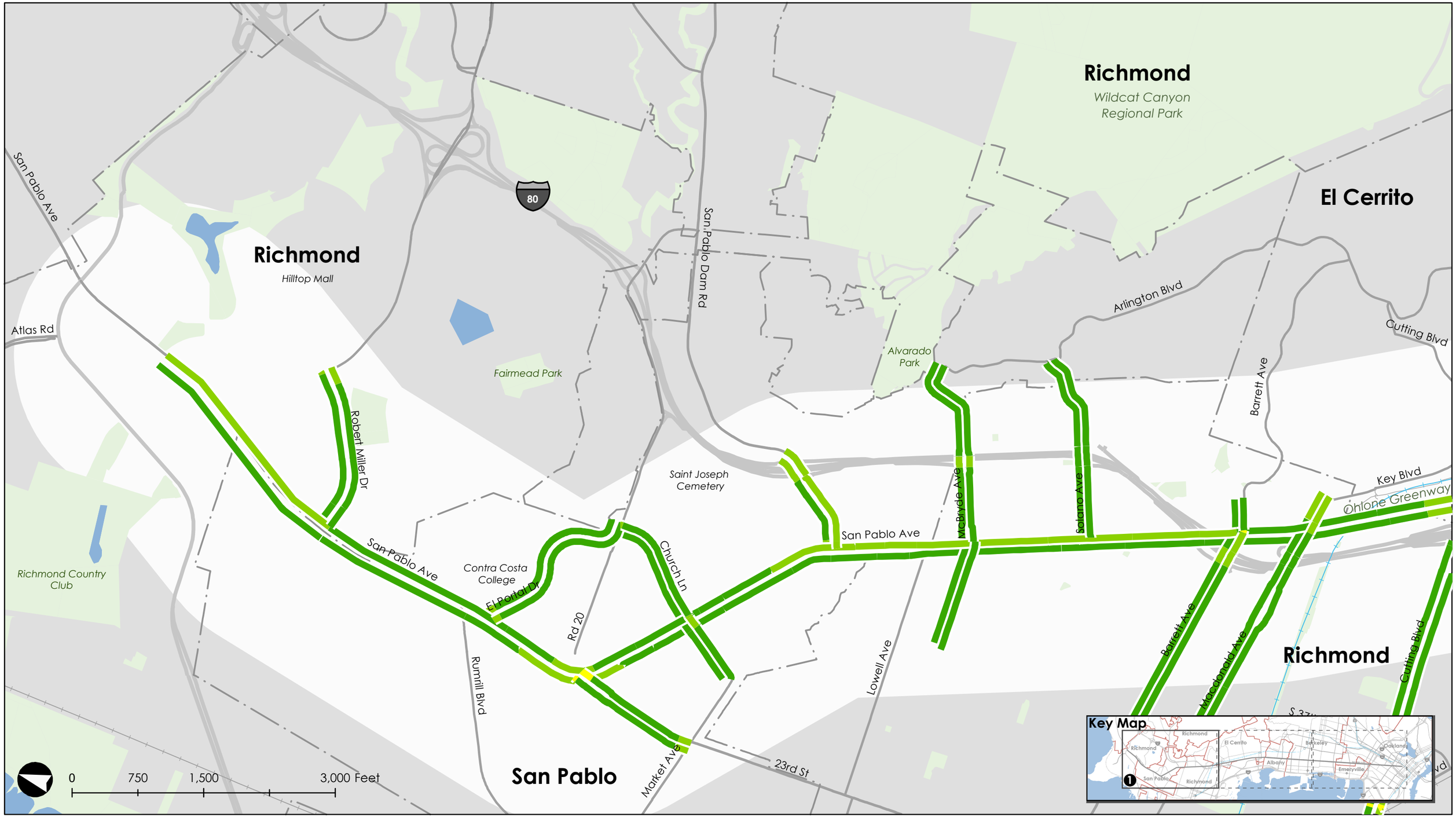
As shown on Figure 5-3, all segments of San Pablo are reliable for autos during the PM peak period. Variability varies by segment, but all segments fall within a medium-high variability range. Within this range of generally good performance, the following northbound San Pablo Avenue segments experience the lowest travel time variability during the PM peak period:

- 20th Street to West Grand Avenue
- Stanford Avenue to Ashby Avenue
- Cedar Street to Gilman Street
- Potrero Avenue to Cutting Boulevard
- Barrett Avenue to McBryde Avenue
- Robert Miller Drive to Hilltop Drive

As shown on the figures in Appendix D, the following southbound San Pablo Avenue segments experience the lowest travel time variability during the AM peak period:

- El Portal Drive to McBryde Avenue
- Barrett Avenue to Potrero Avenue
- Central Avenue to Cedar Street

In general, travel time variability is lowest for southbound San Pablo Avenue during the AM peak period, and lowest for northbound San Pablo Avenue during the PM peak period. Although variability is lower on some segments, travel by auto is generally reliable along San Pablo Avenue.



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Auto Variablity (mph/mph)

- 0.00 - 0.25 High
- 0.25 - 0.50
- 0.50 - 0.75 Medium
- 0.75 - 1.00
- 1.00 - 2.00 Low

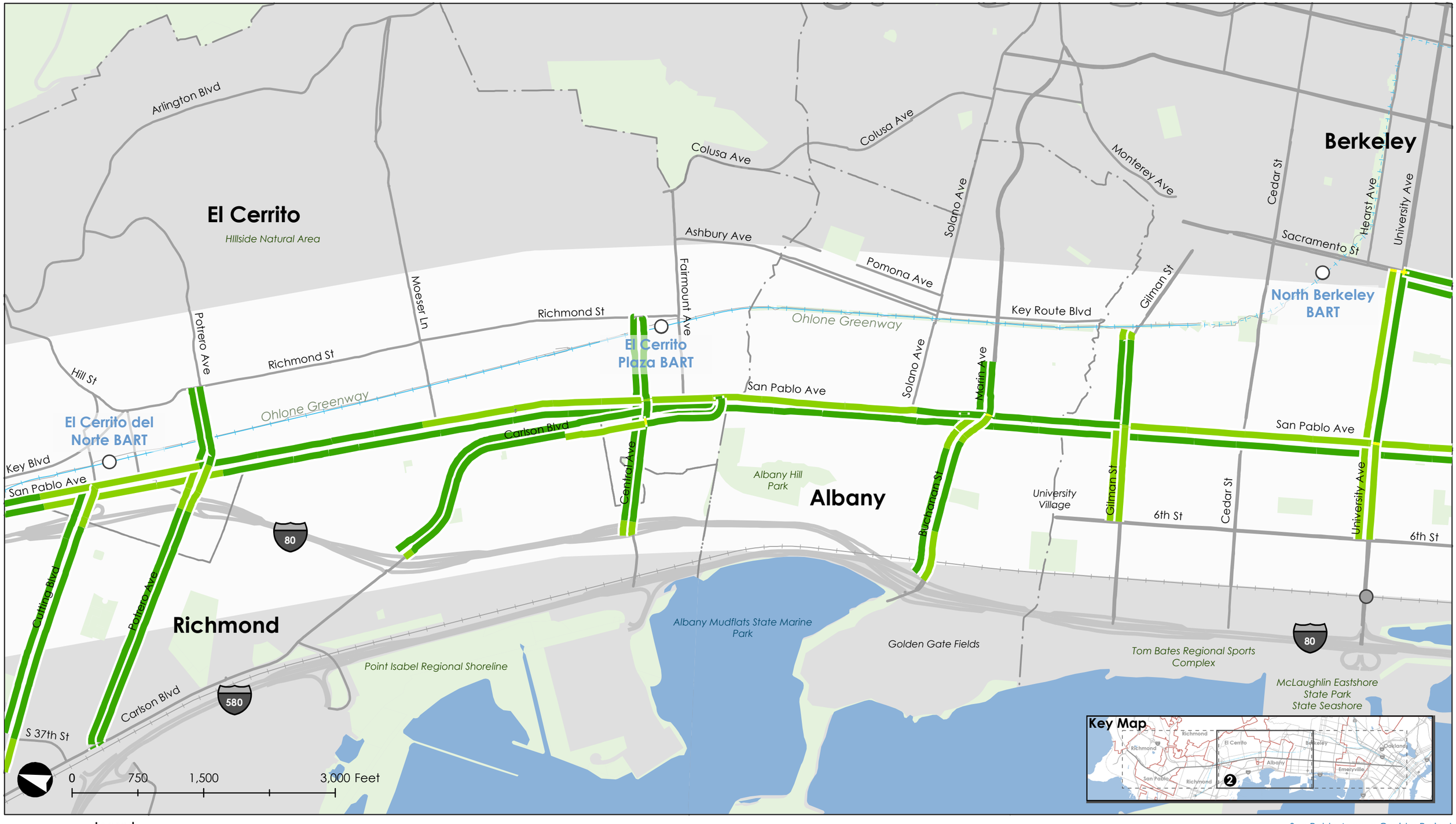
ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 5-3.1

Existing PM Peak Period (4:00 - 6:00 PM) Auto Travel Time Variability

San Pablo Corridor between City of Richmond Boundary and Cutting Boulevard



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Auto Variablity (mph/mph)

- 0.00 - 0.25 High
- 0.25 - 0.50
- 0.50 - 0.75 Medium
- 0.75 - 1.00
- 1.00 - 2.00 Low

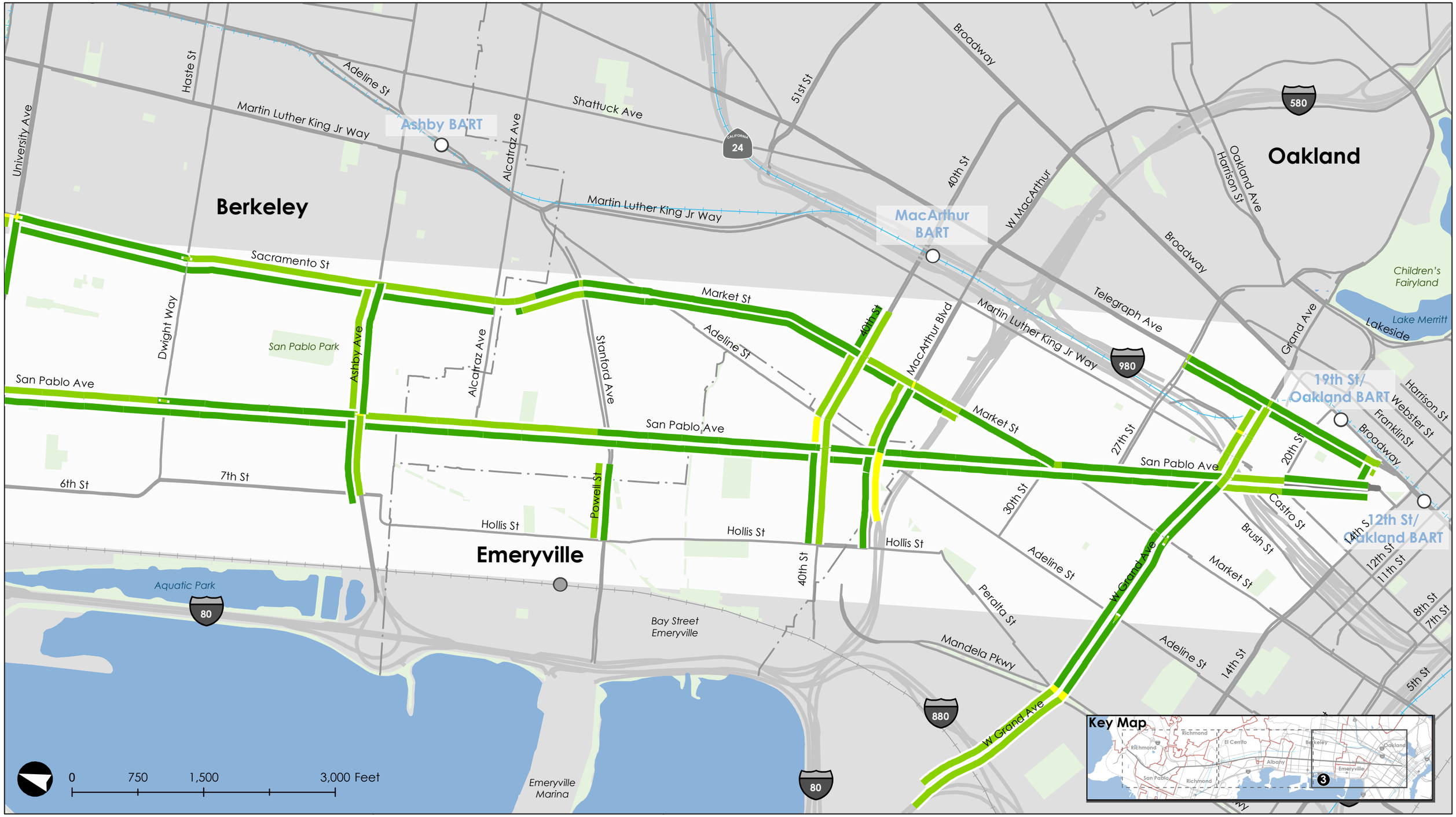
ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 5-3.2

Existing PM Peak Period (4:00 - 6:00 PM) Auto Travel Time Variability

San Pablo Corridor between Cutting Boulevard and University Avenue



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Auto Variablity (mph/mph)

- 0.00 - 0.25 High
- 0.25 - 0.50
- 0.50 - 0.75 Medium
- 0.75 - 1.00
- 1.00 - 2.00 Low

ALAMEDA County Transportation Commission

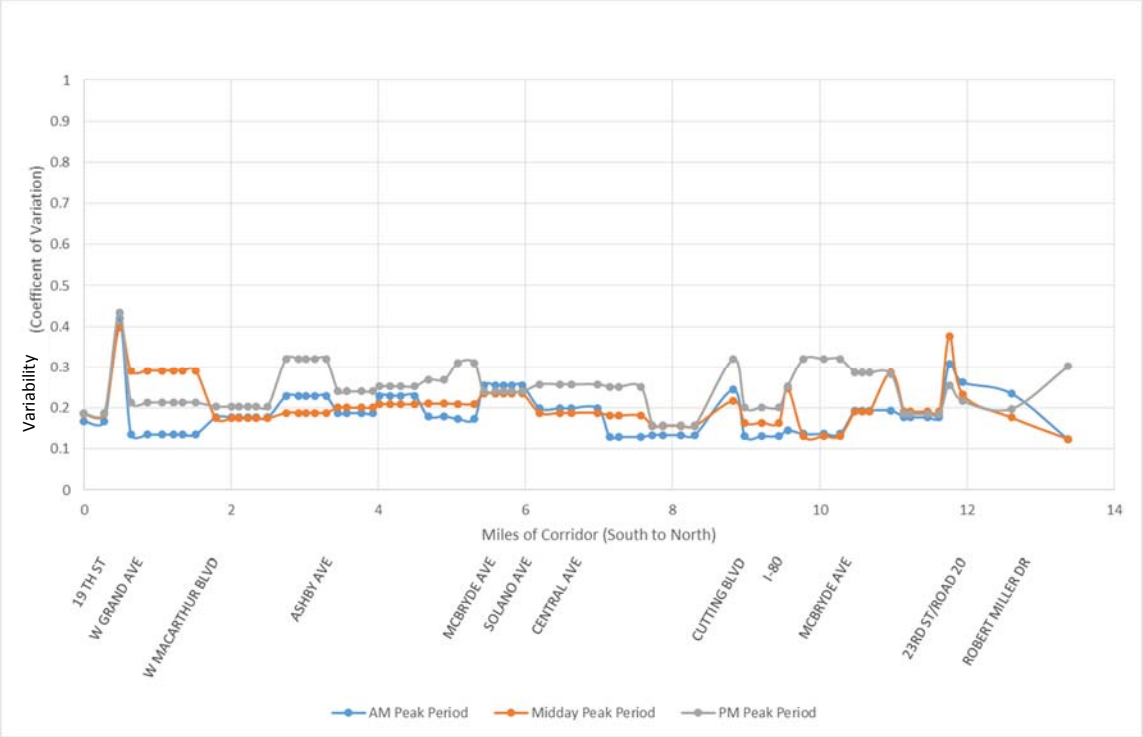
San Pablo Avenue Corridor Project

Figure 5-3.3

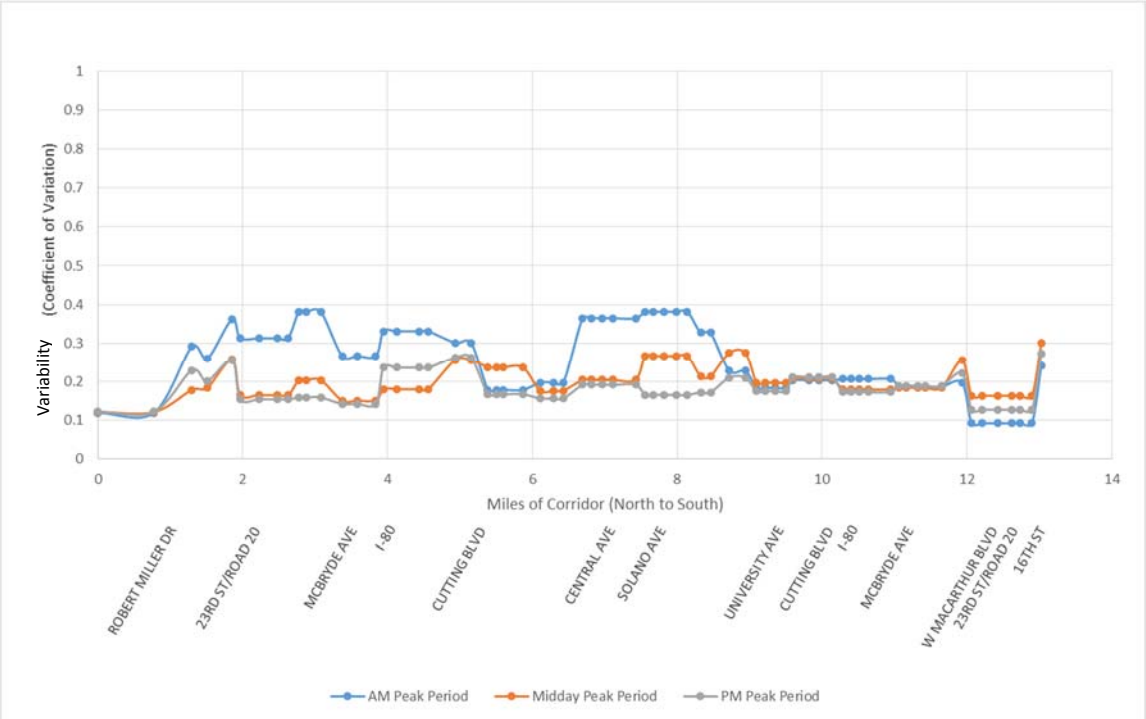
Existing PM Peak Period (4:00 - 6:00 PM) Auto Travel Time Variability

San Pablo Corridor between University Avenue and Frank Ogawa Plaza

Graph 5-3. Existing Peak Period Travel Time Variability – Northbound San Pablo Avenue



Graph 5-4. Existing Peak Period Travel Time Variability – Southbound San Pablo Avenue



5.3 EXISTING INTERSECTION OPERATIONS

Intersection delay, Level of Service (LOS) for key signalized intersections along San Pablo Avenue are summarized in **Table 5-4** for AM and PM peak hours, the LOS analysis worksheets are presented in **Appendix E**. All intersections were analyzed based on pre-I-80 ICM operations (i.e., signal timing and turning movement counts collected in November 2016 before signal timing changes were implemented along San Pablo Avenue). Signal timing updates were implemented along the corridor in winter 2017/2018; however, to ensure consistency in analysis, operational results reflect both signal timing and traffic counts from 2016. Newer count data is not currently available for the corridor as a whole. The Highway Capacity Manual (HCM) 2000 methodology was applied to determine intersection operations. Level of service (LOS) is used to describe the operational condition of a roadway network or intersection. Levels of service are designated "A" through "F" from best to worst, which cover the entire range of traffic operations that might occur. LOS "A" through "E" generally represents traffic volumes at less than roadway capacity, while LOS "F" represents over capacity and/or forced flow conditions.

As shown in Table 5-4, over half of signalized intersections operate at LOS A, B, or C, and all signalized intersections operate at LOS D or better during the weekday peak hours, except for the following intersections:

- San Pablo Avenue at Ashby Avenue (intersection #8) operates at LOS E during PM peak hour;
- San Pablo Avenue at Road 20/23rd Street (intersection #26) operates at LOS E during the PM peak hour; and
- San Pablo Avenue at Robert Miller Drive (intersection #28) operates at LOS E during the AM peak hour.
- San Pablo Avenue at Eastshore Street/ Peerless Avenue/ Hill Street (intersection #29) operates as LOS E during both the AM and PM peak hour.

It should be noted that even at LOS E, cars experience less than 1 minute of delay.

TABLE 5-4: EXISTING PEAK HOUR INTERSECTION LEVEL OF SERVICE

ID	Intersection	Traffic Control	Peak Hour	Critical Movement	LOS[1]	Delay (sec)
1	San Pablo Avenue at West Grand Avenue	Signal	AM	EBL	C	23.4
			PM	WBL	C	26.0
2	San Pablo Avenue at 25th Street/ West Street	Signal	AM	SWL (West St)	A	3.4
			PM	SWL (West St)	A	7.6

TABLE 5-4: EXISTING PEAK HOUR INTERSECTION LEVEL OF SERVICE

ID	Intersection	Traffic Control	Peak Hour	Critical Movement	LOS[1]	Delay (sec)
3	San Pablo Avenue at 27th Street	Signal	AM	EBT	B	13.4
			PM	WBL	B	10.6
4a	San Pablo Avenue at Market Street/ 30th Street	Signal	AM	NBL	A	9.2
			PM	NBL	B	11.2
4b	San Pablo Avenue at Market Street/ 30th Street	Signal	AM	WBL	A	8.7
			PM	WBL	B	11.2
5	San Pablo Avenue at Adeline Street[2]	Signal	AM	EBL	C	23.8
			PM	WBL	C	23.7
6	San Pablo Avenue at 40th Street	Signal	AM	WBL	C	23.8
			PM	SBL	D	36.6
7	San Pablo Avenue at Stanford Avenue	Signal	AM	WBL	C	33.3
			PM	EBT	D	44.3
8	San Pablo Avenue at Ashby Avenue[2]	Signal	AM	EBL	D	38.9
			PM	**NBT**	**E**	**58.4**
9	San Pablo Avenue at Dwight Way	Signal	AM	WBT	D	36.1
			PM	SBL	D	42.3
10	San Pablo Avenue at University Avenue[2]	Signal	AM	SBL	D	47.0
			PM	EBL	D	42.7
11	San Pablo Avenue at Delaware Street	Signal	AM	SBL	B	13.7
			PM	SBL	B	16.5
12	San Pablo Avenue at Gilman Street[2]	Signal	AM	SBT	D	46.6
			PM	NBL	C	30.0
13	San Pablo Avenue at Marin Avenue[2]	Signal	AM	WBL	D	38.3
			PM	NBL	D	42.8

TABLE 5-4: EXISTING PEAK HOUR INTERSECTION LEVEL OF SERVICE

ID	Intersection	Traffic Control	Peak Hour	Critical Movement	LOS[1]	Delay (sec)
14	San Pablo Avenue at Solano Avenue	Signal	AM	SBL	D	50.5
			PM	EBT/NBL	D	38.6
15	San Pablo Avenue at Carlson Avenue[2]	Signal	AM	EBL	D	36.2
			PM	NBL	D	44.2
16	San Pablo Avenue at Fairmount Avenue	Signal	AM	NBL	C	24.7
			PM	NBL	C	23.2
17	San Pablo Avenue at Central Avenue[2]	Signal	AM	SBL	D	42.6
			PM	SBL	D	35.4
18	San Pablo Avenue at Potrero Avenue	Signal	AM	WBL	D	36.4
			PM	EBL	C	28.9
19	San Pablo Avenue at Cutting Boulevard[2]	Signal	AM	EBL	D	35.8
			PM	EBL	D	35.8
20	San Pablo Avenue at Macdonald Avenue	Signal	AM	SBL	C	21.6
			PM	NBL	C	26.7
21	San Pablo Avenue at Barrett Avenue[2]	Signal	AM	WBL	C	31.8
			PM	NBL	C	34.4
22	San Pablo Avenue at Solano Avenue[2]	Signal	AM	WBL	B	17.6
			PM	EBL	C	25.2
23	San Pablo Avenue at McBryde Avenue[2]	Signal	AM	NBL	C	32.6
			PM	SBL	C	30.9
24	San Pablo Avenue at San Pablo Dam Road[2]	Signal	AM	EBT	C	29.6
			PM	EBT	C	29.5
25	San Pablo Avenue at Church Lane	Signal	AM	WBL	D	39.8
			PM	SBL	D	39

TABLE 5-4: EXISTING PEAK HOUR INTERSECTION LEVEL OF SERVICE						
ID	Intersection	Traffic Control	Peak Hour	Critical Movement	LOS[1]	Delay (sec)
26	San Pablo Avenue at Road 20/ 23rd Street	Signal	AM	SBL	D	52.8
			PM	**SBL**	**E**	**58.8**
27	San Pablo Avenue at Broadway Avenue/ El Portal Drive	Signal	AM	SBL	D	38.2
			PM	SBL	C	32.9
28	San Pablo Avenue at Robert Miller Drive	Signal	**AM**	**WBL**	**E**	**65.6**
			PM	WBL	C	28.6
29	San Pablo Avenue at Eastshore Street/ Peerless Avenue/ Hill Street	Signal	**AM**	**EBR**	**E**	**55.6**
			PM	**WBT**	**E**	**58.8**

Notes:

1. LOS = Level-of-Service
2. Intersection provides access to and/or from I-80.
3. Peak direction is southbound in the AM peak hour and northbound in the PM peak hour.

Source: Kimley-Horn, 2017.

5.4 EXISTING INTELLIGENT TRANSPORTATION SYSTEM (ITS) INFRASTRUCTURE

There are a variety of Intelligent Transportation System (ITS) elements installed along San Pablo Avenue, with a substantial portion of the ITS infrastructure having been installed as part of the I-80 Integrated Corridor Mobility (I-80 ICM) project. The Arterial Management System, which was one of several subsystems that comprised of the I-80 ICM project, included traffic signal interconnect, emergency vehicle preemption (EVP), transit signal priority (TSP), informational message signs (IMS), vehicle detection stations (VDS), and traffic monitoring utilizing closed circuit television (CCTV) cameras.

The I-80 ICM project was developed through a partnership between Caltrans, the ten municipalities along the corridor (Oakland, Emeryville, Albany, Berkeley, El Cerrito, Richmond, San Pablo, Pinole, Hercules, and Contra Costa County), transit operators AC Transit and WestCAT, Alameda CTC, Contra Costa Transportation Authority (CCTA), West Contra Costa Transportation Advisory Committee (WCCTAC), Metropolitan Transportation Commission (MTC), and the California Highway Patrol (CHP). The operations and maintenance (O&M) responsibility of the I-80 ICM project elements are documented in the I-80 ICM Memorandum of Understanding (MOU).

5.4.1 CCTV CAMERAS

Traffic monitoring capabilities are provided through use of CCTV cameras located along the San Pablo Avenue corridor, at key intersections and freeway interchanges. These cameras allow Caltrans and local agency staff to monitor the condition and performance of the transportation network during normal operations, incident conditions, and special events. CCTV cameras located at intersections are fixed and are mounted on traffic signal poles. Cameras located at mid-block locations and at freeway interchanges are pan-tilt-zoom (PTZ) cameras which provide greater flexibility to view a wider area. The surveillance system is managed and operated via the I-80 ICM transportation management center (TMC), which is staffed and operated by Caltrans. The video stream from the cameras is available to Caltrans TMC operators as well as local agency staff.

5.4.2 EMERGENCY VEHICLE PREEMPTION (EVP)

Emergency vehicle preemption (EVP) is provided at traffic signals along San Pablo Avenue and crossing arterials. EVP capabilities allow for improved travel times for emergency vehicles (fire trucks, EMS, police) by placing high priority calls to traffic signal controllers.

5.4.3 TRANSIT SIGNAL PRIORITY (TSP)

Transit signal priority (TSP) is an operational strategy that facilitates the movement of transit vehicles and allows for improved schedule adherence and transit travel time efficiency. TSP functionality is provided at many signalized intersections on San Pablo Avenue and various crossing arterials. Implementation of expanded TSP along the corridor is ongoing. Transit vehicles equipped with TSP emitters place low priority calls to traffic signal controllers to provide *green extension* when approaching on green phase and provide *early green* (expedites return to green) when approaching on red.

Transit providers AC Transit and WestCAT are equipped with emitters on buses to interface with traffic signal controllers. However, the majority of the bus and field infrastructure along the project corridor currently support Opticom infrared (IR) technology, which is limited in functionality. AC Transit has identified the need to upgrade TSP infrastructure to GPS-based emitters on vehicles and multi-mode phase selectors in traffic signal controller cabinets to enhance TSP functionality and improve transit variability through a programmed improvement project along San Pablo Avenue.

5.4.4 CHANGEABLE MESSAGE SIGNS (CMS)

Changeable Message Signs (CMS) for incident management are located along San Pablo Avenue at approaches to intersections with designated arterial diversion routes, which are crossing arterial roads connecting San Pablo Avenue and the I-80 freeway. These signs, which are also referred to as Trailblazer signs, are changeable message signs which are activated by Caltrans TMC Operators during freeway incident conditions to

display arrows directing travelers to the appropriate route back onto the freeway using designated arterial diversion routes.

5.4.5 MICROWAVE VEHICLE DETECTION STATIONS (MVDS)

Traffic counts and speeds are collected continuously at several locations along San Pablo Avenue utilizing Microwave Vehicle Detection Stations (MVDS). These counts are collected by microwave radar units mounted high on poles adjacent to the street. Traffic data is available to agencies via an online database.

5.4.6 TRAFFIC SIGNAL SYSTEM

All traffic signals along San Pablo Avenue as well as those along crossing arterial roadways connecting San Pablo Avenue and I-80 have communications infrastructure (fiber optic cable, signal interconnect cable, or wireless connection). Center-to-field (C2F) communications allows Caltrans to communicate with the traffic signal controllers and deploy incident response timing plans to better manage diverted traffic to and from I-80 during incidents on the freeway.

As part of the I-80 ICM project, traffic signal controllers were upgraded along San Pablo Avenue. Several controllers were upgraded from Model 170 to more advanced Model 2070 controllers. Additionally, required traffic signal infrastructure including cellular modems, Ethernet modules, Ethernet switches, and intersection detection were installed at several signalized intersections in the Study Area.

A signal timing study was also performed as part of the I-80 ICM project. This study included development and implementation of recommended weekday peak period signal coordination plans to improve traffic flow along San Pablo Avenue for all modes including automobile, transit, bicyclists and pedestrians. Additionally, the study evaluated existing base timing parameters (minimum green, yellow, all red, pedestrian clearance times) which required updates to comply with current California Manual of Uniform Traffic Control Devices (CA MUTCD) standards; a significant portion of the traffic signals included in the study had not been retimed in over ten years and did not provide sufficient clearance times to accommodate bicyclists and pedestrians per the current standards. Signal timing changes developed and recommended through the study have been implemented.

5.5 KEY FINDINGS

Traffic Operations. Although several segments experience average automobile travel speeds less than 15 mph during the weekday peak periods, automobile travel along San Pablo Avenue is generally reliable. San Pablo Avenue generally peaks along the southbound direction during the AM peak period and along the northbound direction during the PM peak period. Signalized intersections on San Pablo Avenue, during both the AM and PM peak hours, operate acceptably (the majority at LOS C or better and nearly all at LOS D or better) with the exception of the following three intersections:

- San Pablo Avenue at Ashby Avenue in Berkeley (intersection #8) operates at LOS E during PM peak hour;
- San Pablo Avenue at Road 20/23rd Street in San Pablo (intersection #26) operates at LOS E during the PM peak hour; and
- San Pablo Avenue at Robert Miller Drive in San Pablo (intersection #28) operates at LOS E during the AM peak hour.

Intelligent Transportation System. There are a variety of ITS elements installed along the San Pablo Avenue including traffic signal interconnect, emergency vehicle preemption (EVP), transit signal priority (TSP), informational message signs (IMS), vehicle detection stations (VDS), and traffic monitoring utilizing closed circuit television (CCTV) cameras.

6. PARKING

An evaluation of on-street parking supply and occupancy was conducted for the corridor. Given the length of the corridor and budget constraints, a subset of eight miles of the corridor was identified for detailed data collection and analysis. As project concepts are developed in further phases of the Project, additional targeted parking analysis will likely be needed. The following eight miles were evaluated in detail for the initial Existing Conditions report:

- 16th Street to Martin Luther King Jr. Way
- 36th Street to Potrero Avenue
- Road 20 to Rivers Street

A summary of on-street parking supply and occupancy is presented below.

6.1 ON-STREET PARKING SUPPLY

On-street parking supply was identified utilizing online aerial imagery and field observations for the San Pablo Avenue segments listed above. The following types of parking controls exist along the corridor:

- Free – no cost, no time restrictions
- Metered – priced with time restrictions, typically between 8:00 AM and 6:00 PM
- Timed – un-metered with time restrictions, typically between 8:00 AM and 6:00 PM, including short-term parking
- Reserved – authorized vehicle parking only
- ADA – ADA spaces for handicap permit parking only
- Loading – reserved for temporary loading activity with yellow curb paint (material unloading) or white curb parking (passenger unloading), time restrictions vary by jurisdiction as described in Chapter 7
- No parking – parking and loading are prohibited

On-street parking is provided consistently throughout the corridor, with the exception of the following eight full blocks where parking is prohibited:

- Southbound San Pablo Avenue between Ashby Avenue and Murray Street (Berkeley)
- Southbound San Pablo Avenue between 40th Street and Peralta Street (Emeryville)
- Northbound San Pablo Avenue between 21st Street and Castro Street (Oakland)
- Northbound San Pablo Avenue between 36th Street and 37th Street (Emeryville)
- Northbound San Pablo Avenue between MacArthur Boulevard and Adeline Street (Emeryville)
- Northbound San Pablo Avenue between 40th Street and 41st Street (Emeryville)

- Northbound and Southbound San Pablo Avenue between Cutting Boulevard and Hill Street (El Cerrito)
- Northbound San Pablo Avenue between Road 20 and Purisima Street (San Pablo)

The amount of parking spaces available for each parking control type is summarized in **Table 6-1.** A detailed summary of parking supply by block is provided in **Appendix F**. Driveways are not considered as parking spaces in the summary of parking supply.

Approximately 75 percent of parking spaces along the eight miles of the corridor are free, either with or without a time restriction. Another 20 percent of the spaces are metered and the remaining five percent are reserved, handicap or loading spaces. There are five handicap spaces located on San Pablo Avenue within the eight miles of the parking data collection limits, with three located in Berkeley, one in Albany and one in Oakland. Reserved parking spaces with designations for authorized vehicles, such as City of Oakland vehicles, are located only in Downtown Oakland. Free parking with or without time restrictions are provided along San Pablo Avenue within every jurisdiction; free parking spaces are generally located in residential areas of the corridor. The majority of the parking spaces in Oakland, Emeryville, and San Pablo are free without time restrictions while most of the spaces in Berkeley are metered. Albany, Richmond and El Cerrito have high proportions of free parking with time restrictions. About 72 parking spaces (about four percent of the on-street parking supply) were marked as loading zones within the parking data collection limits, the majority of designated loading zones are in Downtown Oakland, Berkeley, and El Cerrito; loading zones are generally located in commercial areas of the corridor.

TABLE 6-1: ON-STREET PARKING SUPPLY BY CONTROL TYPE[1]

Parking Control Type	Number of Spaces	Percent of Total
Free	686	35%
Metered	409	21%
Timed	758	39%
Reserved	13	<1%
ADA	5	<1%
Loading	72	4%
Total	**1,943**	**100%**

Notes:

1. On-street parking supply summarized for eight miles of San Pablo Avenue, including the segments between 16th Street and Martin Luther King Jr. Way, 36th Street and Potrero Avenue, Road 20 to Rivers Street.

Source: Fehr & Peers, November 2017.

The typical time restrictions and hourly costs for on-street parking along San Pablo Avenue are summarized in **Table 6-2**.

TABLE 6-2: ON-STREET PARKING TIME RESTRICTION AND COST SUMMARY

City	Time Limit	Cost
Oakland	2 hours	$2.00/hour or Free
Emeryville	1 hour	Free
Berkeley	30 Minutes to 2 hours	$1.50/hour or Free
Albany	90 Minutes	Free
El Cerrito	1 hour to 2 hours	Free
Richmond	1 hour to 2 hours	Free
San Pablo	1 hour	Free

Source: Fehr & Peers, November 2017.

Berkeley and Oakland are the only cities along the corridor that manage a subset of the on-street parking supply with meters. Both cities also have a small portion of timed parking spaces that are not metered.

Although off-street parking supply was not evaluated as part of this Project, the provision of off-street parking for land uses on San Pablo Avenue is more common in Contra Costa County than in Alameda County.

6.1.1 LOADING ZONES

A total of 72 parking spaces (about four percent of the on-street parking supply) are marked as loading zones within the parking data collection limits described above. Loading zones operations vary by jurisdiction as summarized in **Table 6-3**. Loading zones are typically marked by yellow or white curb paint. In general, most loading zones operate between 7:00 AM and 6:00 PM Monday through Saturday, commercial vehicles may park in yellow loading zones for up to 20 – 30 minutes, and vehicles loading or unloading passengers may park in either yellow or white loading zones for up to three minutes.

TABLE 6-3: LOADING ZONE RESTRICTIONS		
City	Yellow Curbs	White Curbs
Oakland	• Enforced 7:00 AM – 6:00 PM, Monday through Saturday • 30 Minute Limit for Commercial Vehicle Loading • 3 Minute Limit for Passenger Loading	• Enforced 7:00 AM – 6:00 PM, Monday through Sunday • 3 Minute Limit for Passenger Loading
Emeryville	• Enforced 24 Hours a Day, 7 Days a Week • 10 Minute Limit for Commercial Vehicle Loading • 3 Minute Limit for Passenger Loading	• Emeryville does not have white curb loading designation in the City's Municipal Code
Berkeley	• Enforced 7:00 AM – 6:00 PM, Monday through Saturday • 20 Minute Limit for Commercial Vehicle Loading • 3 Minute Limit for Passenger Loading	• Enforced 24 Hours a Day, 7 Days a Week • 3 Minute Limit for Passenger Loading
Albany	• Enforced 8:00 AM – 6:00 PM, Monday through Saturday • 20 Minute Limit for Commercial Vehicle Loading • 3 Minute Limit for Passenger Loading	• Enforced 8:00 AM – 6:00 PM, Monday through Sunday • 3 Minute Limit for Passenger Loading
El Cerrito	• Enforced 7:00 AM – 6:00 PM, Monday through Sunday • 30 Minute Limit for Commercial Vehicle Loading • 3 Minute Limit for Passenger Loading	• Enforced 24 Hours a Day, 7 Days a Week • 3 Minute Limit for Passenger Loading
Richmond	• Enforced 7:00 AM – 6:00 PM, Monday through Sunday • 30 Minute Limit for Commercial Vehicle Loading • 3 Minute Limit for Passenger Loading	• Enforced 24 Hours a Day, 7 Days a Week • 3 Minute Limit for Passenger Loading
San Pablo	• Enforced 8:00 AM – 6:00 PM, Monday through Saturday • 20 Minute Limit for Commercial Vehicle Loading • 3 Minute Time Limit for Passenger Loading	• Enforced 8:00 AM – 6:00 PM, Monday through Saturday • 3 Minute Limit for Passenger Loading

6.2 ON-STREET PARKING OCCUPANCY

On-Street parking occupancy data was collected along the corridor during the weekday morning (6:00 to 9:00 AM), weekday evening (4:00 to 7:00 PM) and Saturday afternoon (1:00 to 3:00 PM) peak periods. Parking data was collected between September 14, 2017 and October 3, 2017 during the weekday and weekend peak periods along the eight miles of segments. On-street parking occupancy data was collected for the eight miles of segments detailed above using unmanned aerial vehicles (also known as drones) equipped with video cameras for all hours except between 6:00 to 7:00 AM. The 6:00 to 7:00 AM hour was too dark to be observed using drone video cameras, therefore the data was collected by driving the corridor.

On-street parking occupancy during the weekday PM peak period is presented on **Figure 6-1,** figures showing parking occupancy during the weekday AM and Saturday PM peak periods are presented in Appendix F. Parking occupancy during the weekday PM peak period is generally higher than the weekday AM peak period, therefore the discussion in this section is primarily focused on parking occupancy during the weekday PM peak period. The figures show parking occupancy as a percentage of parking spaces filled per block. These figures present the average parking occupancy during each peak period of data collection. As shown on Figure 6-1, several blocks along the corridor were observed with on-street parking occupancy over 100 percent. The primary reason for blocks having occupancy over 100 percent is due to illegal parking. Cars were observed parking illegally in driveways and areas with red curb. Illegal parking occurred most often during the weekday PM peak periods. A detailed summary of parking occupancy by block for all hours within the peak periods is provided in Appendix F.

On-street parking occupancy generally peaked during the following hours within the weekday and Saturday peak periods:

- Between 8:00 and 9:00 AM on weekdays, vehicles occupied about 34 percent of the on-street parking supply.
- Between 6:00 and 7:00 PM on weekdays, vehicles occupied about 50 percent of the on-street parking supply.
- Between 1:00 and 2:00 PM on Saturdays, vehicles occupied about 54 percent of on-street parking supply.

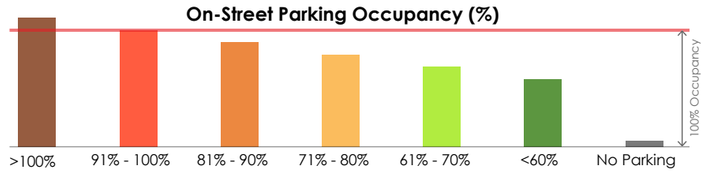
A land use analysis to determine the location and amount of parcels that are vacant or underutilized was not conducted as part of this project. Therefore, it is possible that some of the segments that experience low parking utilization during the weekday and weekend peak periods may be adjacent to parcels that are vacant or underutilized.

0 750 1,500 3,000 Feet

Legend:

- BART Station
- BART Lines Above Ground
- Capitol Corridor Stations
- Capitol Corridor Line
- Freeways
- Water
- Parks/Open Space

On-Street Parking Occupancy (%)



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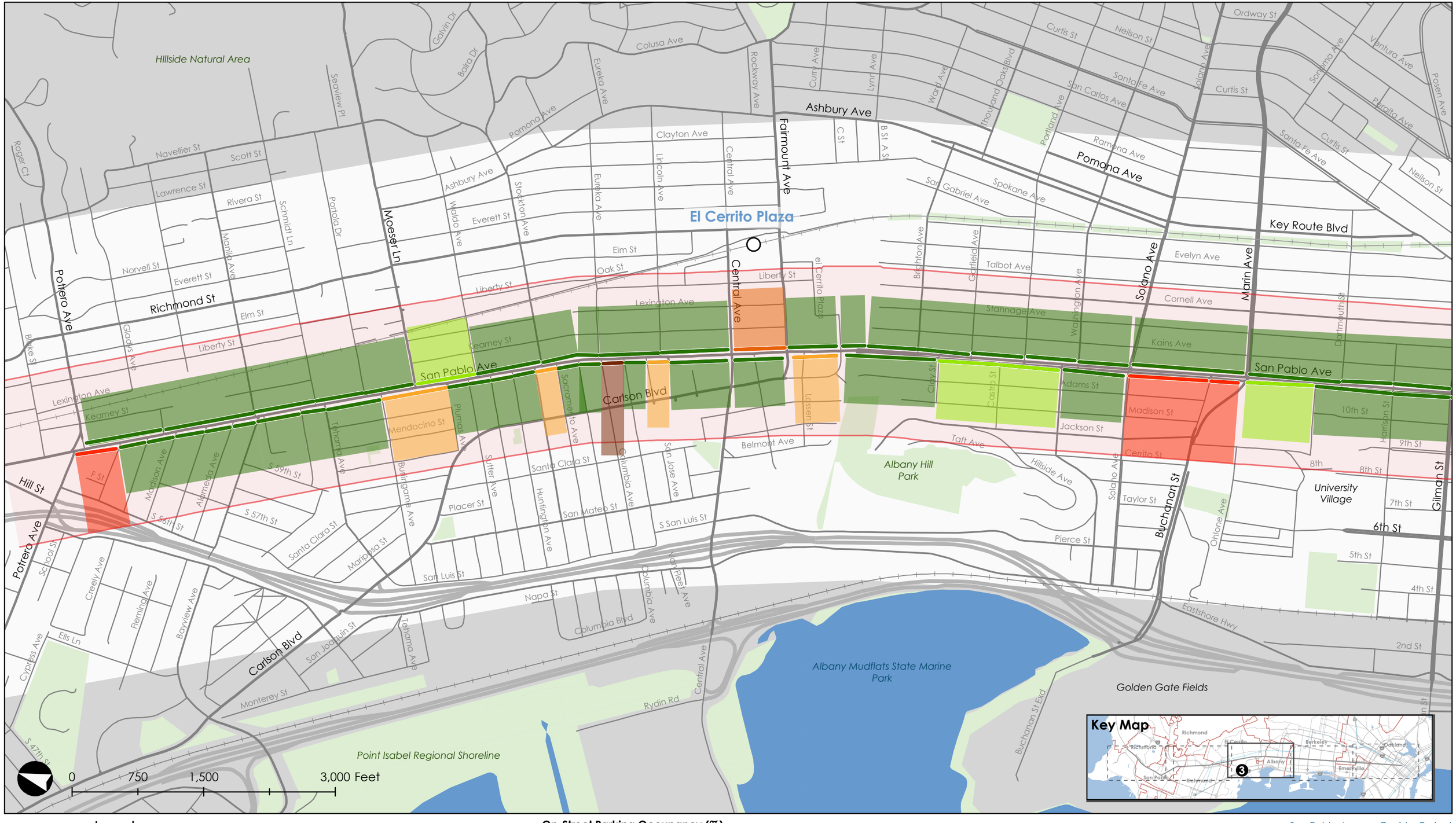
San Pablo Avenue Corridor Project

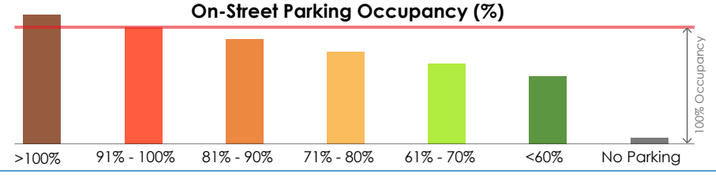
Figure 6-1.1

On-Street Parking Occupancy – Weekday PM Peak Period (4:00 – 7:00 PM)



Legend:

- BART Station
- BART Lines Above Ground
- Capitol Corridor Stations
- Capitol Corridor Line
- Freeways
- Water
- Parks/Open Space



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San Pablo Avenue Corridor Project

Figure 6-1.2

On-Street Parking Occupancy – Weekday PM Peak Period (4:00 – 7:00 PM)

North Berkeley

Sacramento St
Gilman St
Posen Ave
Acton St
Ada St
Hopkins St
Curtis St
Peralta Ave
Rose St
Franklin St
West St
Berkeley Way
University Ave
Addison St
Spaulding Ave
Jefferson Ave
McGee Ave
California St
Edwards St
Channing Way
Dwight Way
Derby St
Ward St
Stuart St
Oregon St
Russell St
Ellis St
Harper St
Adeline St
Martin Luther King Jr
63rd St
60th St
58th St
Dover St
57th St
Genoa St
Aileen St
King St
Julia St
Ashby Ave
Tyler St
Prince St
Fairview St
Woolsey St
Harmon St
62nd St
Market St
Talbot Ave
Santa Fe Ave
Cedar St
Virginia St
Francisco St
Delaware St
Chestnut St
Bonar St
Bancroft Way
Blake St
Parker St
Carleton St
Acton St
Dohr St
Stanton St
Park St
San Pablo Park
67th St
66th St
Boise St
Idaho St
Haskell St
Carlson St
Burnett St
Alcatraz Ave
63rd St
61st St
60th St
Stanford Ave
Doyle St
Lowell St
Cornell Ave
Kains Ave
Byron St
Curtis St
Mathews St
Wallace St
Ward St
Addison St
Allston Way
Dwight Way
Parger St
Grayson St
Folger Ave
Herzog St
San Pablo Ave
10th St
9th St
8th St
7th St
6th St
5th St
4th St
3rd St
2nd St
Camelia St
Page St
Jones St
Hearst Ave
Bancroft Way
Cutter Way
Carleton St
Heinz Ave
Potter St
Peabody Ln
64th St
62nd St
59th St
57th St
54th St
Aileen St
Marshall St
Fremont St
Vallejo St
55th St
Beaudry St
Doyle St
Hollis St
Powell St
Overland St
Bay St
Shellmound St
Shellmound Way
Christie Ave
Eastshore Hwy
Bolivar Dr
W Bolivar Dr
Frontage Rd
Aquatic Park
Tom Bates Regional Sports Complex
McLaughlin Eastshore State Park
State Seashore
Virginia St Exd
University Ave
Gilman St

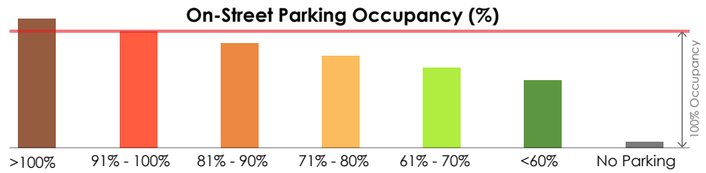
0 750 1,500 3,000 Feet

Key Map
Richmond
El Cerrito
Berkeley
Oakland
Albany
Emeryville
San Pablo
Richmond
4

Legend:

- BART Station
- BART Lines Above Ground
- Capitol Corridor Stations
- Capitol Corridor Line
- Freeways
- Water
- Parks/Open Space

On-Street Parking Occupancy (%)



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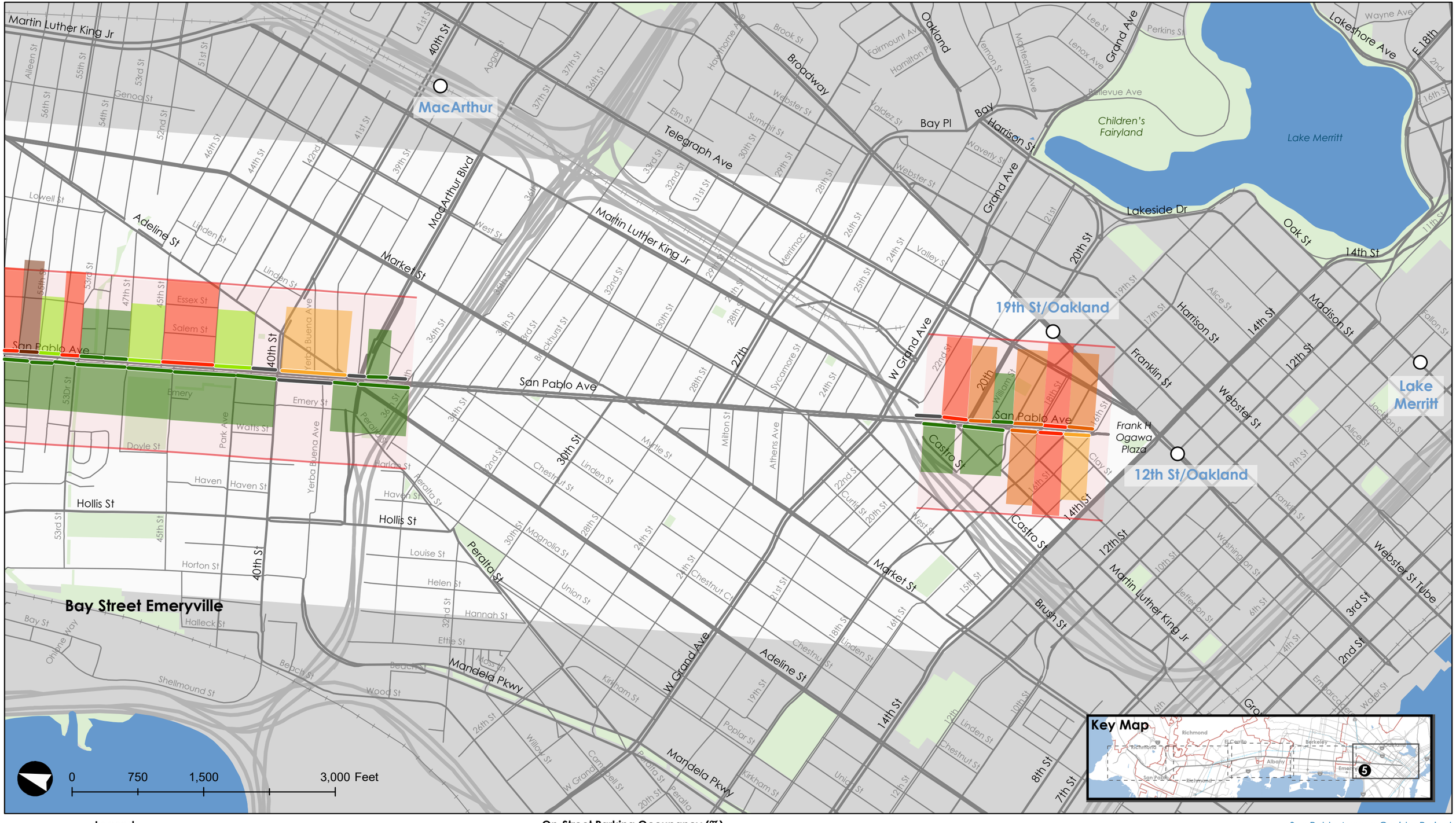
San Pablo Avenue Corridor Project

Figure 6-1.3

On-Street Parking Occupancy – Weekday PM Peak Period (4:00 – 7:00 PM)



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San Pablo Avenue Corridor Project

Figure 6-1.4

On-Street Parking Occupancy – Weekday PM Peak Period (4:00 – 7:00 PM)

Parking demand fluctuates throughout the peak periods and tends to be higher in the commercial areas of San Pablo Avenue. During every time period, most blocks are less than 60 percent full. The following blocks experience parking occupancy greater than 90 percent during the weekday PM peak hour:

- Southbound San Pablo Avenue between Potrero Avenue and Cypress Avenue (El Cerrito)
- Southbound San Pablo Avenue between Columbia Boulevard and Van Fleet Avenue (El Cerrito)
- Northbound San Pablo Avenue between Central Avenue and Fairmont Avenue (El Cerrito)
- Northbound San Pablo Avenue between Allston Way and Addison Street (Berkeley)
- Northbound and Southbound San Pablo Avenue between Dwight Way and Carleton Street (Berkeley)
- Southbound San Pablo Avenue between Peabody Lane and Ocean Avenue (Oakland)
- Northbound San Pablo Avenue between 53rd Street and 59th Street (Oakland)
- Northbound San Pablo Avenue between 43rd Street and 45th Street (Emeryville)
- Northbound San Pablo Avenue between Adeline Street and 40th Street (Emeryville)
- Northbound San Pablo Avenue between 17th Street and 21st Street (Oakland)
- Southbound San Pablo Avenue between 17th Street and 19th Street (Oakland)

The highest parking demand was in Downtown Oakland during the weekday evening between 6:00 and 7:00 PM. The majority of on-street parking on San Pablo Avenue in Downtown Oakland is metered, however, the City of Oakland only enforces metered parking between 8:00 AM and 6:00 PM on weekdays and Saturdays, parking is free after 6:00 PM, which results in higher on-street parking demand. Parking on most blocks in Downtown Oakland were occupied during this time but some spaces were still available on southbound San Pablo Avenue.

Other segments of San Pablo Avenue that generally experience on-street parking occupancies greater than 90 percent during the weekday AM or the Saturday PM peak hour include segments in the vicinity of El Cerrito Plaza BART Station, University Avenue, Dwight Avenue, Ashby Avenue, Alcatraz Avenue, Stanford Avenue, 40th Street, and Downtown Oakland. On blocks where parking supply is completely occupied, there are available spaces less than three blocks away (on San Pablo Avenue and side-streets) or on the other side of San Pablo Avenue.

6.3 KEY FINDINGS

On-street parking supply and controls vary throughout the corridor. Only the cities of Berkeley and Oakland charge for on-street parking on weekdays and Saturdays, all other jurisdictions allow users to park for free along San Pablo Avenue with or without time limits. Parking occupancy fluctuates throughout the weekday and Saturday peak periods. Parking occupancy tends to be higher in commercial areas of the corridor and lower in residential areas. This suggests that on-street parking may be an important element to operations for businesses along the corridor that do not have off-street parking. On-street parking occupancy is generally higher during the weekday PM and Saturday PM peak periods, and lower during the weekday AM peak periods. Occupancy was less than 60 percent on many blocks along the corridor. Where parking occupancy was high, open spaces were always available within three blocks or on the opposite side of the street.

7. GOODS MOVEMENT

Goods movement is critical to maintaining and enhancing the economic vitality of the San Pablo Avenue corridor, however trucks often compete with passenger transportation and increasing congestion affects both. This chapter describes the goods movement network within and surrounding San Pablo Avenue, in addition to a general summary of truck delivery operations along the corridor.

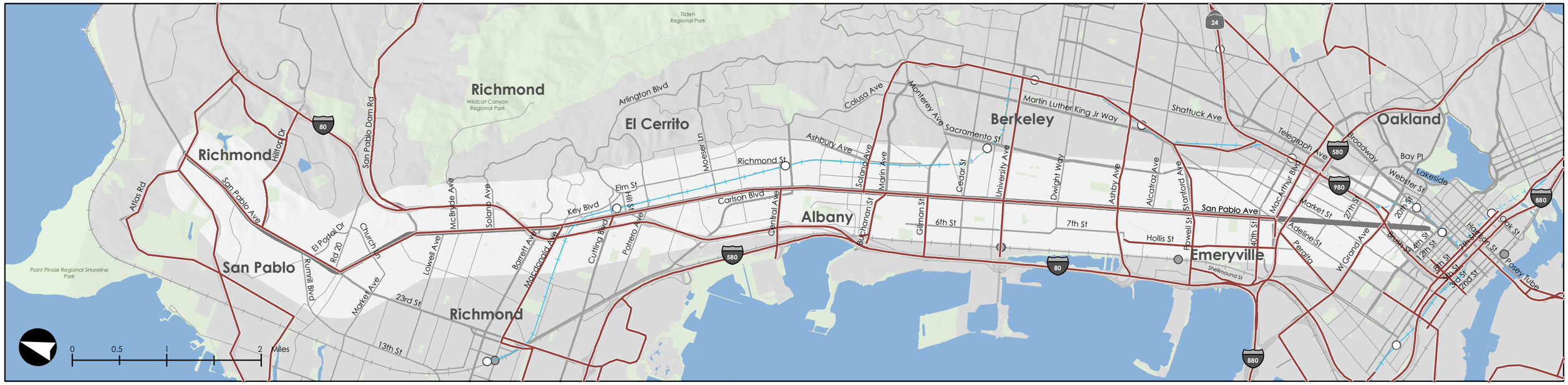
7.1 GOODS MOVEMENT NETWORK

Overall, San Pablo Avenue is a key component of the region's diverse goods movement system. The adopted truck routes that make up the goods movement network are shown on **Figure 7-1**, these routes are based on the information provided by Caltrans, the *Alameda Countywide Goods Movement Plan*, and local jurisdictions. As shown on Figure 7-1, San Pablo Avenue north of MacArthur Boulevard is classified as a truck route. The *Alameda Countywide Goods Movement Plan* classifies San Pablo Avenue between MacArthur Boulevard and the northern border of Alameda County as a "Tier 2 Goods Movement Route", which refers to designated arterials that provide intra-County and intercity connectivity. San Pablo Avenue also provides intra-County and intercity goods movement connectivity in Contra Costa County. The *Alameda Countywide Multimodal Arterial Plan* also identifies San Pablo Avenue as having high goods movement modal priority within the City of Berkeley due to the high level of commercial and retail activity along the street and input from City of Berkeley staff; the goods movement modal priority is low along all other segments within Alameda County based on input from local jurisdiction staff.

According to truck counts collected by Caltrans in 2016, trucks (with two or more axles) make up about two to three percent of the Average Daily Traffic (ADT) along the corridor.

7.2 GOODS MOVEMENT OPERATIONS

As described later in Chapter 10, there are several commercial areas and retail nodes along San Pablo Avenue. Providing adequate truck access and parking to allow for deliveries to businesses along the corridor is critical to support individual businesses and the overall economic vitality of the corridor. Chapter 6 presents a detailed evaluation of on-street parking supply (including loading zones), in addition to peak period parking occupancy along eight miles of San Pablo Avenue. In the evaluation of on-street parking supply, 72 parking spaces (about four percent of the on-street parking supply) were marked as loading zones within the parking data collection limits described in Chapter 6. Loading zone designations, hours of operations, and time limits are summarized in Table 6-3.



San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Freeways
- Water
- Parks/Open Space
- Truck Route Network

ALAMEDA County Transportation Commission

Figure 7-1
Goods Movement Network

In general, most loading zones operate between 7:00 AM and 6:00 PM Monday through Saturday, commercial vehicles may park in yellow loading zones for up to 20 – 30 minutes, and vehicles loading or unloading passengers may park in either yellow or white loading zones for up to three minutes.

The Consultant Team conducted field observations to observe goods movement delivery operations along San Pablo Avenue during the weekday AM and PM peak periods. Loading activity is typically highest during the morning peak period between 7:00 and 9:00 AM. Many businesses along the corridor do not provide off-street loading docks or parking spaces, therefore goods movement loading occurs on San Pablo Avenue regardless of the availability and designation of curb space. Loading generally does not occur in the designated loading spaces as trucks prefer to park as close to the delivery point as possible. If there is curb space available, trucks will utilize the curb space regardless of the designation or on-street parking prohibitions, otherwise trucks will double park and block a travel lane on San Pablo Avenue if curb space is not available. Double parking can often create bottlenecks for vehicles traveling on San Pablo Avenue that result in queuing upstream of the bottleneck. Loading activities tended to cluster around major intersections in commercials areas, such as the areas surrounding the following intersections:

- San Pablo Avenue/Solano Avenue
- San Pablo Avenue/University Avenue
- San Pablo Avenue/Ashby Avenue
- San Pablo Avenue/40th Street

In some cases, trucks were also observed to park in the two-way center turn lane (median). Businesses on San Pablo Avenue that provide off-street loading zones are more common in Contra Costa County than in Alameda County.

7.3 KEY FINDINGS

San Pablo Avenue is a key goods movement facility in the region, providing intra-County and intercity goods movement connectivity. Maintaining and improving goods movement access is a critical component to supporting the economic health and competitiveness of businesses along the San Pablo Avenue Corridor. Although several on-street parking spaces are designated as loading zones along San Pablo Avenue, the reality is that many trucks do not utilize the loading spaces, as they prefer to park as close to the delivery point as possible regardless of the availability and designation of curb space. These findings suggest that the development of Project concepts should take into account the occurrence of trucks double parking or parking in the median on San Pablo Avenue. Changes to on-street curb-management practices to better serve truck loading activities in the commercial districts along the corridor should be considered.

8. SAFETY

Collisions in the corridor that resulted in injury were analyzed for the years 2009 through 2013[4]; these included auto-auto, auto-bicyclist, and auto-pedestrian collisions. During that time period, 793 injury collisions occurred on the Project Corridor, of which about 19 percent involved a pedestrian and 19 percent involved a bicyclist. Five percent of all collisions involved fatal or severe injuries. Bicyclists and pedestrians are over represented in those fatal or severe injury collisions relative to their use of the Project Corridor. People walking account for 37 percent of all fatal and severe injury collisions, and bicyclists account for 27 percent of fatal and severe injuries. When looking at fatalities alone, pedestrians and bicyclists are even more disproportionately affected. In the last five years, five people were killed on the Project Corridor, four of which were pedestrians and one of which was a bicyclist. No fatalities occurred in auto-only collisions.

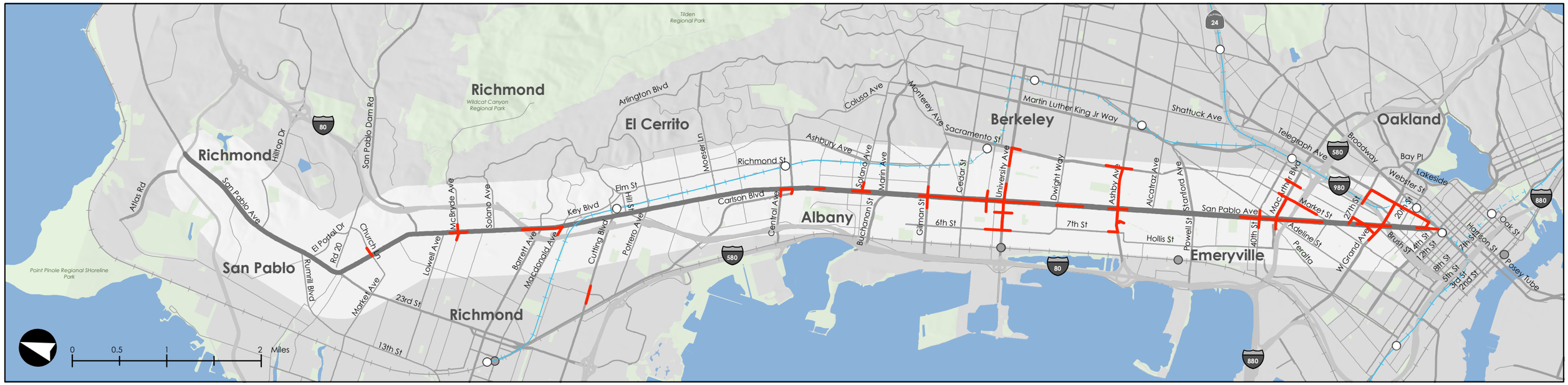
8.1 HIGH INJURY NETWORK

To understand patterns and prevalence of collisions on the Project Corridor, a High Injury Network (HIN) was developed for all three collision mode types (i.e., auto-auto, auto-bicyclist, and auto-pedestrian). The HIN identifies the portions of the Project Corridor with the highest levels of fatal and severe injury collisions for pedestrians, bicyclists, and motorists. This is a way of identifying a set of priority locations for safety enhancements.

The HIN was developed using a collision density metric attached to the road network that assigned a higher weight to collisions involving a fatality or severe injury. For example, a fatal collision weighted five times that of a minor injury collision, and a severe injury collision is weighted three times. The resulting calculation by mode were then added together to create the multimodal HIN index. Subsequent sections examine collisions for each mode in turn. The final index used to create the HIN network was based on the average of the percentile ranks of the weighted collision density metrics for pedestrian bicycle and vehicle collisions. Taken together, the HIN accounts for approximately 50 percent of all collisions involving a fatality or severe injury on the Project Corridor that occur on only 20 percent of San Pablo Avenue.

Figure 8-1 presents the High Injury Network for the Project. This map identifies high injury segments along San Pablo Avenue as well as side streets in the Study Area. The side streets are important to identify in this context, as they may present barriers to accessing San Pablo Avenue. For example, Central Avenue, University Avenue, Ashby Avenue, and MacArthur Boulevard have higher densities of injury collisions.

[4] Data pulled from the Transportation Injury Mapping System (TIMS) for the last five years of available data.



San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Freeways
- Water
- Parks/Open Space
- High Injury Network

ALAMEDA County Transportation Commission

Figure 8-1
High Injury Network

The sections below present HIN analysis for three areas of the Project Corridor: northern, central, and southern. These areas were defined based on spacing of collisions, collision hot spots, and similarities with adjacent areas. The mileage of each section varies.

8.1.1 NORTHERN AREA OF THE PROJECT HIN (SAN PABLO, RICHMOND, EL CERRITO)

The northern area of the Project HIN includes San Pablo, Richmond, and El Cerrito (6 miles). This area sees the lowest overall volume of collisions. Of these, there are higher collision densities around Church Lane (San Pablo), McBryde Avenue (Richmond), between Barrett and Macdonald Avenues (Richmond), and between Central Avenue and Carlson Boulevard (El Cerrito). **Chart 8-1** presents the collisions on the northern area of the Project HIN by mode. The majority of the collisions – 63 percent – are auto-only, and 30 percent of the collisions involved bicyclists. Fewer collisions involve pedestrians than the central and southern segments. This generally corresponds with the level of pedestrian activity on the northern portion of the Project Corridor; however, bicyclist collisions are over represented relative to their likely volumes.

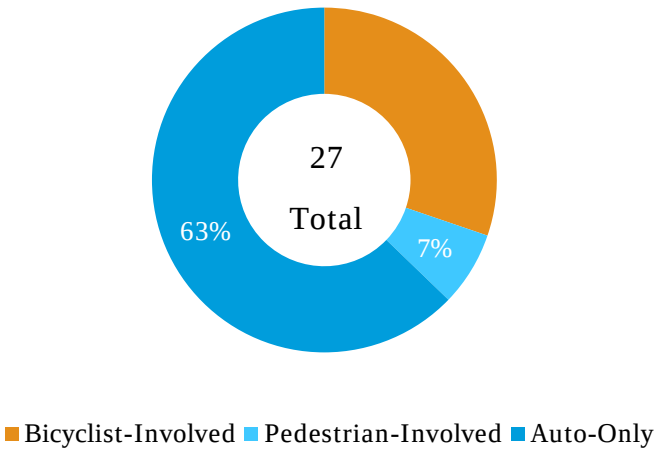


Chart 8-1. Collision Types on Northern Area of the Project HIN
Source: TIMS database, 2009 – 2013.

Table 8-1 presents the violation categories for collisions in the northern HIN Project Corridor by mode. The majority of bicycle collisions were related to wrong-way riding. The small number of pedestrian collisions were related to autos violating the pedestrian's right of way or traveling at an unsafe speed. Auto collisions were typically related to unsafe speeds, unsafe lane changes, and violation of another auto's right of way. Unsafe speeds accounted for the largest portion of collisions overall. Countermeasures focused on reducing auto speeds may address many of the collision types for all modes. A combination of bicyclist education as well as improved bicycle facilities both on San Pablo and for bicyclists turning to and from side streets may address the wrong-way riding bicycle collisions.

TABLE 8-1: NORTHERN AREA OF HIN - VIOLATION CATEGORIES

Category	Bike Collisions		Ped Collisions		Auto Collisions	
	#	%	#	%	#	%
Driving or Bicycling Under the Influence of Alcohol or Drug	0	0%	0	0%	2	7%
Unsafe Speed	0	0%	1	33%	9	33%
Wrong Side of Road	7	53%	0	0%	0	0%
Improper Passing	1	8%	0	0%	0	0%
Unsafe Lane Change	1	8%	0	0%	4	15%
Improper Turning	2	15%	0	0%	2	7%
Automobile Right of Way	0	0%	0	0%	3	11%
Pedestrian Right of Way Violation	0	0%	2	67%	0	0%
Traffic Signals and Signs	1	8%	0	0%	2	7%
Other Hazardous Violation	1	8%	0	0%	1	4%
Not Stated	0	0%	0	0%	4	16%
Total	**13**	**100%**	**3**	**100%**	**27**	**100%**

Source: TIMS database, 2009 – 2013.

8.1.2 CENTRAL AREA OF THE PROJECT HIN (ALBANY, BERKELEY)

The central area of the Project HIN includes Albany and Berkeley south to Ashby Avenue (3.5 miles). This area sees the highest number of collisions overall with 65% more that the southern section and nearly 500% more than the northern area. This is primarily due to a particularly high number of auto collisions. The highest collision densities occur around Solano Avenue and most of San Pablo Avenue between Gilman Street and Ashby Avenue. **Chart 8-2** presents the collisions on the central area of HIN by mode. The majority of the collisions – 65 percent – are auto-only. About 20 percent of collision involved pedestrians, and 16 percent involved bicyclists. This generally corresponds with the higher level of pedestrian activity in the Albany and Berkeley segments.

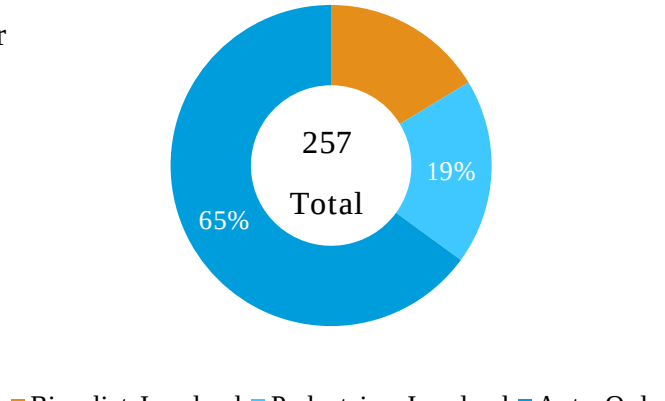


Chart 8-2. Collision Types on Central Area of the Project HIN Corridor
Source: TIMS database. 2009 – 2013.

Table 8-2 presents the violation categories for the central area of the Project HIN by mode. Again, unsafe speed accounted for the majority of collisions overall (36%). Most bicycle collisions are related to improper turning (24 percent). Bicycle-involved collisions due to autos traveling at an unsafe speed were also prevalent (14 percent), as well as bicyclist failing to yield the right-of-way to autos (14 percent). Unsafe speeds were also the most common auto-only violation, with 50 percent of collisions resulting from speeding. The majority of pedestrian collisions (58 percent) resulted from automobiles failing to yield the right of way to pedestrians, and 17 percent were due to pedestrians committing a violation. Based on these collision types, countermeasures to address these collisions may include:

- Speed reduction measures to improve safety outcomes for all modes
- Countermeasures to address pedestrian safety at intersections such as daylighting crosswalks with red curb to improve sight lines[5], installing protected left-turn signals, and reducing pedestrian crossing distances to decrease exposure

[5] Striping red curb at intersections where on-street parking is allowed opens sight lines between drivers and pedestrians standing at the curb waiting to cross the street.

- Facility improvements to support safer bicyclists' turning movements to and from San Pablo Avenue
- Bicycle facilities that create clear expectations between drivers and bicyclists

TABLE 8-2: CENTRAL AREA OF HIN - VIOLATION CATEGORIES

Category	Bicyclist-Involved		Pedestrian-Involved		Auto-Involved	
	#	%	#	%	#	%
Driving or Bicycling Under the Influence of Alcohol or Drug	2	5%	0	0%	13	8%
Unsafe Speed	6	14%	4	8%	83	50%
Wrong Side of Road	8	19%	0	0%	2	1%
Improper Turning	10	24%	2	4%	9	5%
Automobile Right of Way	6	14%	1	2%	30	17%
Pedestrian Right of Way Violation	0	0%	28	58%	0	0%
Pedestrian Violation	0	0%	8	18%	0	0%
Traffic Signals and Signs	2	5%	0	0%	3	2%
Other Hazardous Violation	5	12%	0	0%	4	2%
Other Than Driver (or Pedestrian)	0	0%	0	0%	1	1%
Unsafe Starting or Backing	0	0%	2	4%	8	5%
Other	2	5%	0	2%	11	7%
Not Stated	1	2%	2	4%	3	2%
Total	**42**	**100%**	**48**	**100%**	**167**	**100%**

Source: TIMS database, 2009 – 2013.

8.1.3 SOUTHERN AREA OF THE PROJECT HIN (BEKELEY, EMERYVILLE, OAKLAND)

The southern area of the Project HIN includes Berkeley south of Ashby Avenue, Emeryville, and Oakland (3.3 miles). This area has fewer collisions than the central part but over three times more than the northern section. Compared to the northern and central areas, the southern area has the highest share of biking and walking related collisions.

The highest collision areas occur in the Clawson, Hoover\Foster, and Uptown areas. **Chart 8-3** presents the collisions on the Project HIN in the southern area by mode. About half of the collisions are auto-only (52 percent), and about half are related to active modes, with 25 percent of collisions being pedestrian-involved and 23 percent being bicyclist-involved.

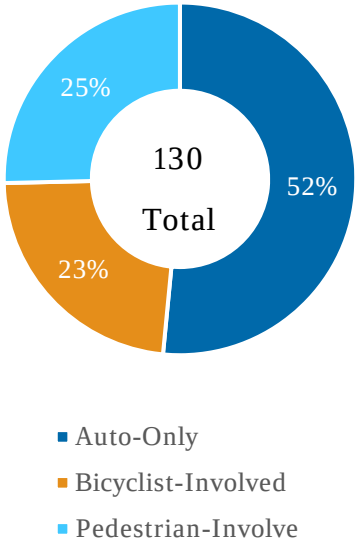


Chart 8-3. Collision Types on Southern Area of the Project HIN
Source: TIMS database, 2009 – 2013.

Table 8-3 presents the violation categories for the southern area by mode. Similar to the central area, 23 percent of bicycle-involved collisions were related to improper turning, 20 percent to wrong side of the road riding, and 17 percent to bicyclists violating the auto right of way. Almost forty percent of pedestrian-involved collisions (39 percent) were related to drivers violating the pedestrian right of way, with another 39 percent relating to pedestrians committing a violation. Unsafe speed was the primary factor in 40 percent of auto-only collisions.

Similar to the central area, countermeasures focused on the following areas may address these kinds of collision types:

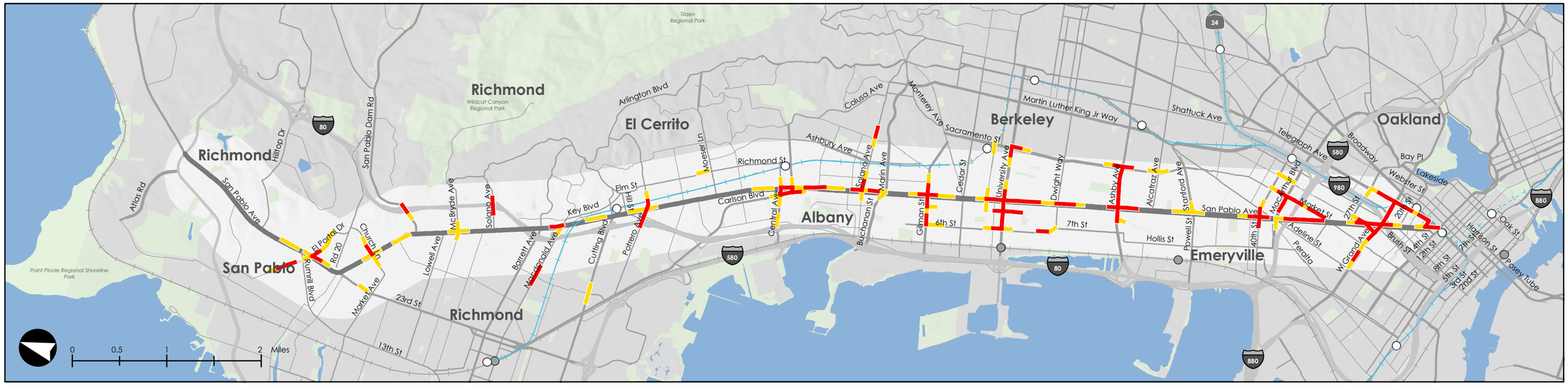
- Speed reduction measures may improve safety outcomes for all modes
- Countermeasures to address pedestrian safety at intersections may include daylighting crosswalks with red curb to improve sight lines, protecting auto turning movements at signals, and reducing pedestrian crossing distances to decrease exposure
- Facility improvements to support safer bicyclists' turning movements to and from San Pablo Avenue
- Dedicated bicycle facilities may create expectations between drivers and bicyclists

TABLE 8-3: SOUTHERN AREA OF HIN - VIOLATION CATEGORIES						
	Bicyclist-Involved		Pedestrian-Involved		Auto-Only	
Category	#	%	#	%	#	%
Unsafe Speed	2	7%	1	3%	27	40%
Following Too Closely	0	0%	0	0%	2	3%
Wrong Side of Road	6	20%	0	0%	0	0%
Improper Passing	2	7%	0	0%	0	0%
Unsafe Lane Change	2	7%	0	0%	1	1%
Improper Turning	7	23%	0	0%	7	11%
Automobile Right of Way	5	17%	1	3%	13	20%
Pedestrian Right of Way Violation	0	0%	13	39%	0	0%
Pedestrian Violation	1	3%	13	39%	0	0%
Traffic Signals and Signs	0	0%	2	7%	5	7%
Other Hazardous Violation	1	3%	0	0%	2	3%
Unsafe Starting or Backing	0	0%	1	3%	4	6%
Unknown	3	10%	1	3%	2	3%
Other	1	3%	1	3%	4	6%
Total	**30**	**100%**	**33**	**100%**	**67**	**100%**

Source: TIMS database, 2009 – 2013.

8.2 PEDESTRIAN-INVOLVED COLLISIONS

Approximately 30 collisions involving pedestrians occur each year on San Pablo Avenue (149 total during the 5-year period; the tables above only include the 84 collisions which occurred in the HIN). During the last five years, 10 percent of all pedestrian-involved collisions resulted in fatal or severe injuries. **Figure 8-2** presents the density heat map of pedestrian-involved collisions on the Project Corridor. In addition the areas identified in the HIN in Figure 8-1, high pedestrian collision segments are also found on El Portal Drive in San Pablo as well as Potrero Avenue in El Cerrito in the northern area of the Project Corridor. The pedestrian collision densities align with the HIN in the central and southern segments.



San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Freeways
- Water
- Parks/Open Space

High Pedestrian Collision Segments

- High (Top 20th Percentile)
- Medium (Top 40th Percentile)

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Figure 8-2
Pedestrian Collisions Heat Map

8.2.1 VIOLATION CATEGORIES

Table 8-4 presents the violation categories for pedestrian-involved collisions for the Project Corridor (both on and off the HIN). Over half of the collisions resulted from drivers failing to yield the right of way to pedestrians. This points to engineering countermeasures that affect driver behavior as being a key focus area. Approximately 22 percent of collisions resulted from the pedestrian committing a violation, such as crossing the roadway with undue care. This points to engineering countermeasures focused on pedestrian behavior, as well as education. Unsafe speed was the third highest category, accounting for about five percent of pedestrian-involved collisions.

Among the fatal and severe injury collisions, drivers violating the pedestrian right of way was the most prevalent factor (40 percent), followed by pedestrian violating the auto right of way (27 percent), and autos traveling at unsafe speeds (20 percent). Measures that reduce speed may address many of these collisions.

TABLE 8-4: PEDESTRIAN-INVOLVED COLLISIONS VIOLATION CATEGORIES FOR THE PROJECT CORRIDOR

Category	Number	Percentage
Pedestrian Right of Way Violation	80	53%
Pedestrian Violation	33	22%
Unsafe Speed	7	5%
Not Stated	7	5%
Other	22	15%
Total	**149**	**100%**

Source: TIMS database, 2009 – 2013.

8.2.2 CROSSING AT CROSSWALKS

Chart 8-4 explains the pedestrian action during the collision. Though the distances between crossings are typically long on San Pablo Avenue, 75 percent of pedestrian collisions occurred while a pedestrian was crossing in a crosswalk[6]. This indicates engineering enhancements at existing crosswalks on San Pablo Avenue as important for addressing pedestrian collisions.

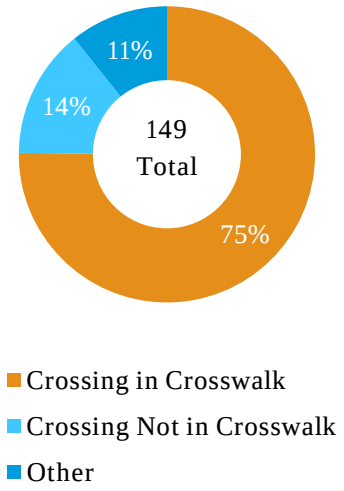


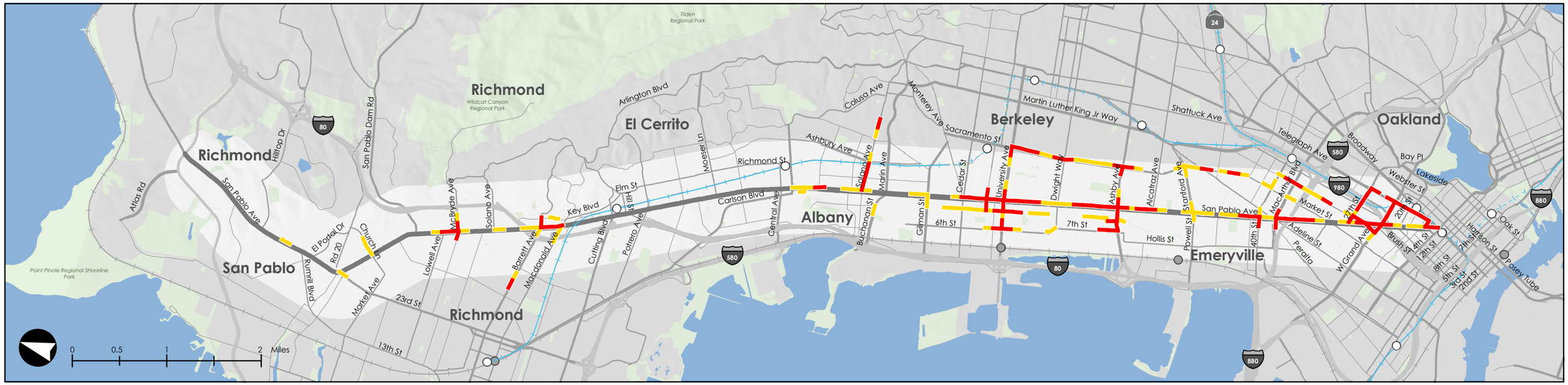
Chart 8-4. Pedestrian Collision Locations on San Pablo Avenue
Source: TIMS database, 2009 – 2013.

8.3 BICYCLE-INVOLVED COLLISIONS

About 149 bicyclist-involved collisions occur each year on the Project Corridor. The majority of the collisions occurred at the intersection (52 percent) or within 100 feet of the intersection (35 percent). Intersection and intersection approaches are the areas where bicyclists are typically most vulnerable, as complex maneuvering with vehicles is often required. This includes autos merging toward the bicyclist path of travel to make a right turn or the bicyclist merging toward the auto path of travel to make a left turn. The remaining collisions occurred away from an intersection. These might result from passing interactions with cars or conflicts with car doors opening into the bicyclist's path.

Figure 8-3 presents the density heat map of bicyclist-involved collisions on the Project Corridor. In the northern area, Church Lane appears as a medium density area, where as it reflects a higher overall density for all modes in the HIN. In the central area, the high density of bicycle collisions are between Cedar Street and Alcatraz Avenue, which largely overlaps with the overall HIN (there are small differences in the extent of the HIN which identifies Gilman Street to Ashby Avenue as the primary segment). In the southern area, bicycle collision densities are concentrated near 40th Street, MacArthur Boulevard, and between 27th Street and West Grand Avenue. This is consistent with the HIN.

[6] A crosswalk here is defined as a legal crosswalk per the California Vehicle Code, which means that it may either be marked with stripes or unmarked but still legal.



San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Freeways
- Water
- Parks/Open Space

High Bicycle Collision Segments

- High (Top 20th Percentile)
- Medium (Top 40th Percentile)

ALAMEDA County Transportation Commission

Figure 8-3
Bicycle Collisions Heat Map

Table 8-5 show violation categories for all bicycle collisions on the Project Corridor. There are a variety of factors that account for bicyclist-involved collisions. Almost one quarter of collisions resulted from improper turning on the Project Corridor. This may be due to right-hook collisions in which an auto is making a right turn and strikes a bicyclist proceeding through. Riding on the wrong side of the roadway was also a high cause of collision at about 20 percent of all collisions. Failure to observe traffic signals and signs and unsafe speeds were also common factors for drivers. Among the fatal and severe injury collisions, the most prevalent factors were improper passing, improper turning, and violating the automobile right of way.

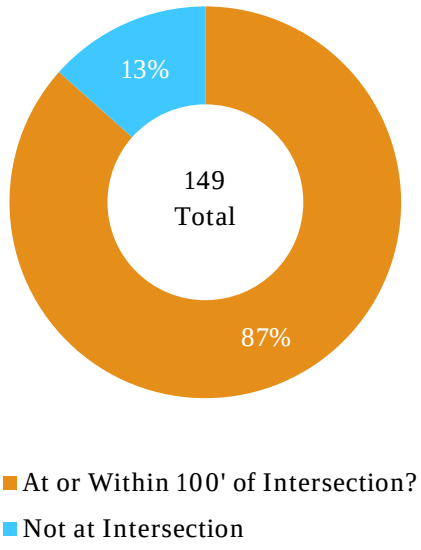


Chart 8-5. Bicycle Collision Types on San Pablo Avenue
Source: TIMS database, 2009 – 2013.

TABLE 8-5: BICYCLIST-INVOLVED COLLISIONS VIOLATION CATEGORIES FOR THE PROJECT CORRIDOR

Category	Number	Percentage
Improper Turning	36	24%
Wrong Side of Road	30	20%
Automobile Right of Way	26	17%
Other Hazardous Violation	16	11%
Traffic Signals and Signs	10	7%
Unsafe Speed	9	6%
Other	20	14%
Not Stated	28	1%
Total	**149**	**100%**

Source: TIMS database, 2009 – 2013.

8.4 AUTO-ONLY COLLISIONS

A total of 495 collisions between autos (including trucks and motorcycles) occurred on the Project Corridor. Of these, only three percent of collisions (15 total) resulted in severe injury for a driver or passenger. Most crashes involved typical passenger vehicles, with only nine percent of vehicles involving a pick-up or panel truck, three percent involving motorcycles, and one percent involving a truck. **Figure 8-4** presents the density heat map of auto-only collisions on the Project Corridor, which largely parallels the HIN. In the northern area, El Portal Drive also sees higher auto collisions, but is not represented in the HIN.

8.4.1 AUTO-ONLY VIOLATION CATEGORIES

Table 8-6 presents the common automobile-only collision violation categories. The highest violation category for auto-only crashes was unsafe speed (38 percent), with the second highest category (18 percent) related to failure to yield to other automobiles. No fatal auto collision occurred. Severe injury collisions included driving under the influence, unsafe speed, or an unknown cause.

TABLE 8-6: AUTO-ONLY COLLISIONS VIOLATION CATEGORIES FOR THE PROJECT CORRIDOR

Category	Number	Percentage
Unsafe Speed	189	38%
Automobile Right of Way	87	18%
Other	58	12%
Improper Turning	42	8%
Driving or Bicycling Under the Influence of Alcohol or Drug	37	7%
Following Too Closely	34	7%
Traffic Signals and Signs	25	5%
Unsafe Starting or Backing	23	5%
Total	**495**	**100%**

Source: TIMS database, 2009 – 2013.

San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Freeways
- Water
- Parks/Open Space

High Vehicle Collision Segments

- High (Top 20th Percentile)
- Medium (Top 40th Percentile)

ALAMEDA County Transportation Commission

Figure 8-4
Automobile Collisions Heat Map

8.4.2 COLLISION LOCATION & TYPE

Chart 8-6 presents the location of automobile-only collisions on the Project Corridor. Unlike pedestrians and bicyclists, the majority of collisions occur between intersections.

Chart 8-7 presents the collisions types for automobile-only collisions on the Project Corridor. Over half of the collisions were rear-end collisions, 23 percent were broadsides, and 12 percent were sideswipe collisions.

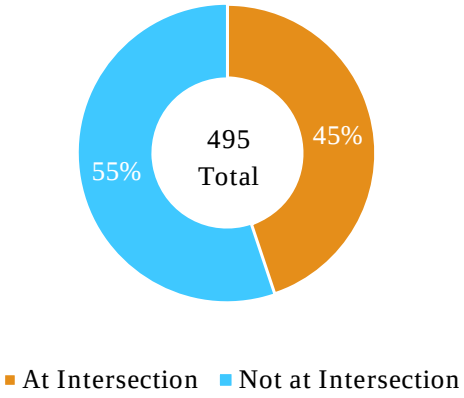


Chart 8-6. Auto-Only Collision Locations
Source: TIMS database, 2009 – 2013.

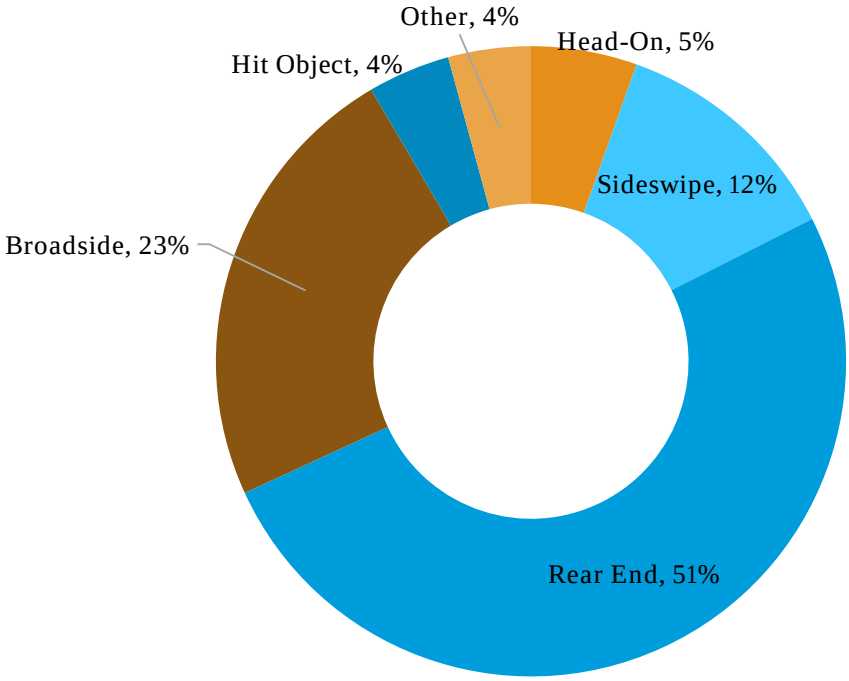


Chart 8-7. Auto-Only Collision Types
Source: TIMS database, 2009 – 2013.

8.5 KEY FINDINGS

Bicyclists and pedestrian-involved collisions are over-represented in the collision records relative to the existing volumes on the Project Corridor.

All along the Project Corridor, most collisions occur at or within 100 feet of an intersection. This indicates countermeasures at intersections and intersection approaches may be most impactful, particularly for addressing the needs of the most vulnerable roadway users, bicyclists and pedestrians. Unsafe speed is a common collision factor between all modes, and should be a consideration in future investments on the Project Corridor.

The northern area of the Project Corridor sees collision densities around Church Lane (San Pablo), McBryde Avenue (Richmond), between Barrett and Macdonald Avenues (Richmond), and between Central Avenue and Carlson Boulevard (El Cerrito). In addition to addressing speeds, a combination of bicyclist education as well as improved bicycle facilities on San Pablo as well as for bicyclists turning to and from side streets may address the wrong-way riding bicycle collisions.

The central area sees the highest collision densities around Solano Avenue and most of San Pablo Avenue between Gilman Street and Ashby Avenue. Based on these collision types, countermeasures to addresses these collisions may include:

- Speed reduction measures may improve safety outcomes for all modes
- Countermeasures to address pedestrian safety at intersections could include daylighting crosswalks with red curb to improve sight lines, protecting auto turning movements at signals, and reducing pedestrian crossing distances to decrease exposure
- Turning movement support for bicyclists turning to and from the Project Corridor
- Dedicated bicycle facilities may create expectations between drivers and bicyclists

The central area contains the most mileage and highest number of collisions on the HIN. As a result, it should be a key area for investment.

The southern area sees collision densities through Emeryville and in Oakland in the Clawson, Hoover\Foster, and Uptown areas. These collisions may be addressed with similar countermeasures to the central segment. The southern area sees the most biking and walking related collision densities on the HIN, particularly compared to the northern segment. The southern area also contains significant HIN mileage and may be a key area for investment.

9. EXISTING TRAVEL MARKETS

Existing auto travel patterns for the San Pablo Avenue Corridor show that there is a significant market for improvements to transit, bicycle, and pedestrian facilities and that a significant number of trips do not stop on the Corridor and simply pass through to reach their destinations. These key findings support the need for investments in multimodal facilities as a way to increase Corridor throughput and provide a more balanced set of mobility options.

9.1 KEY FINDINGS

Table 9-1 shows the key findings from the existing travel markets analysis. The target market for this analysis is assumed to be any trip that both starts and ends within the Study Area. This is because trips that both start and end within the Corridor are the trips most likely to switch to active or transit modes if multimodal improvements are made on the Corridor. Pass through trips are trips that neither begin nor end within the Study Area. As Table 9-1 shows, there are almost twice as many pass through auto trips as there are trips that could shift to active or transit modes of transportation. This indicates that there are a significant number of travelers that could shift to other routes, such as Interstate 80, without negatively impacting the local economy if active or transit modes are prioritized on San Pablo Avenue to the detriment of automobile throughput.

The total size of the target market is over 13,000 trips in the morning period (6:00-10:00 AM). This includes over 600 trips that could shift to walk trips, over 5,400 trips that could shift to bicycle trips, and over 6,900 trips that could shift to transit. Auto trips that could potentially shift modes were classified as walk, bike, or transit trips based on their length. All trips shorter than 0.5 miles were considered potential walk trips, rather than bike or transit trips; similarly, all trips between 0.5 miles and two miles in length were considered potential bike trips, rather than a transit trip. These trip lengths were determined to avoid double counting trips, as these trips could plausibly be served by walking, biking, or taking transit. Any target market trip longer than two miles was considered a potential transit trip.

TABLE 9-1: TRAVEL MARKETS ANALYSIS – MORNING PERIOD KEY FINDINGS					
Direction	Study Area-to-Study Area (Target Market) Trips				Pass Through Trip Market
	Total Size of Target Market	*Shift to Walk*[1]	*Shift to Bike*[2]	*Shift to Transit*[3]	
Northbound	4,720	*350*	*2,310*	*2,060*	11,140
Southbound	8,350	*300*	*3,140*	*4,910*	13,320
Total	**13,070**	***650***	***5,450***	***6,970***	**24,460**

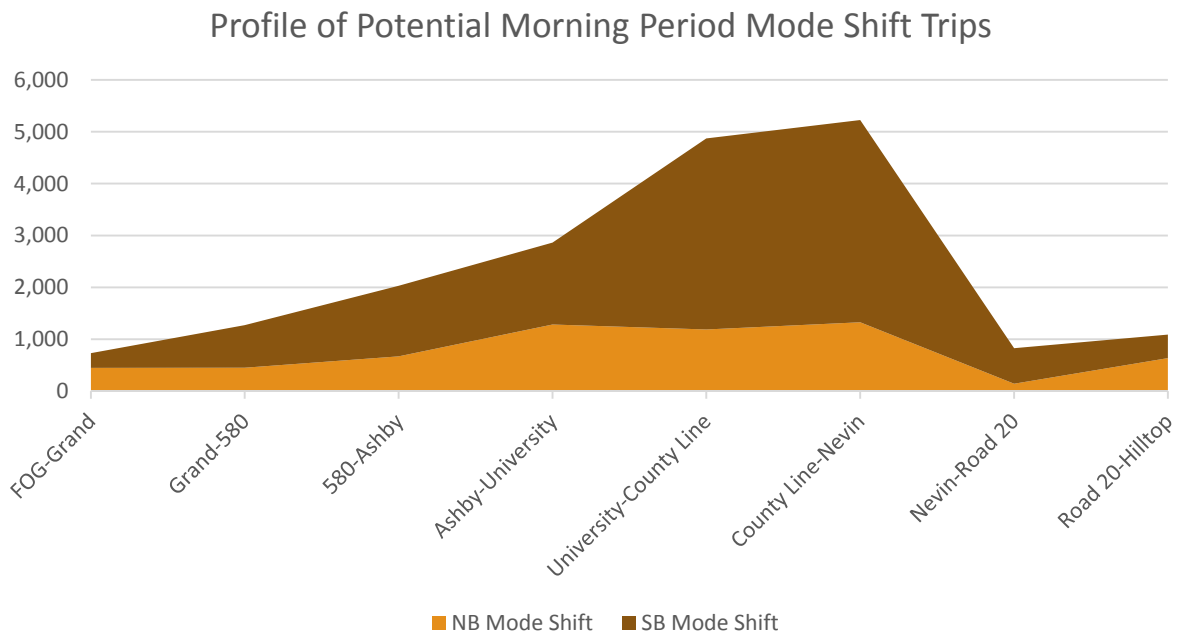
Notes:

1. All trips shorter than 0.5 miles were considered potential walk trips, rather than bike or transit trips.
2. All trips between 0.5 miles and two miles in length were considered potential bike trips, rather than a transit trip.
3. Potential transit trips include all trips over two miles in length. Some shorter trips would likely shift to transit, but these are captured in the "Shift to Bike" number to avoid double counting.

Graph 9-1 shows the geographic distribution of the trips that could shift modes along the Corridor. The trips that could shift to active or transit modes are concentrated along the portion of San Pablo Avenue between the Interstate 580 overpass at the Emeryville-Oakland border and Nevin Road in Richmond. The two tail ends of the Corridor have relatively little mode shift potential, although for different reasons. In the north end, the travel patterns are dominated by autos trying to access Interstate 80 to reach destinations outside the Corridor, while in the southern end, the patterns are more conducive to mode shifts, but the overall travel volumes are low relative to the rest of the Corridor. These travel patterns indicate that targeting near-term multimodal improvements in the central portion of the Corridor would result in the largest shift to active or transit modes.

This remainder of this section introduces the approach to the travel markets analysis and provides more insight into Study Area-to-Study Area and pass through trip patterns. Further detail and information is provided in **Appendix G**.

Graph 9-1: Profile of Potential Morning Period Mode Shift Trips



9.2 APPROACH TO THE TRAVEL MARKETS ANALYSIS

The intent of the travel markets analysis is to provide support in the identification of near- and long-term improvements for the Corridor by helping to understand potential impacts to existing Corridor travelers. The analysis relies on recent data collected via GPS to:

- Identify the overall size of the existing travel market and portion of that market likely to change behavior based on changes to transportation facilities and capacities on San Pablo Avenue
- Understand what proportion of the market could shift from auto to transit, biking, or walking, taking into account the presence of BART and transbay bus service that provide access to San Francisco and other urban centers
- Identify where along the Corridor the trips with the largest potential for mode shift are clustered to help target investment to the areas where they are most needed
- Identify auto trips that provide relatively little local economic benefit and would potentially shift to an alternate route if existing capacity on San Pablo Avenue was reallocated to prioritize more efficient modes and local economic development needs

Another focus of the analysis is to identify the travel patterns associated with the key business nodes along the Corridor to support discussions with business owners about the potential benefits and impacts of proposed improvements. For brevity, this portion

of the travel markets analysis is not included in the body of the report, but may be found in Appendix G.

Overall, this approach provides a solid basis for identifying multimodal investments that will result in mode shift away from autos, in turn increasing the efficiency and throughput of the corridor in the near term, and for engaging key stakeholders to understand benefits and impacts of potential improvements.

9.2.1 TRAVEL MARKETS METHODOLOGY

The travel markets analysis is based on travel patterns for auto trips on the Corridor. To determine the travel patterns, a representative sample of origin-destination data[7] for auto trips was obtained from StreetLight Data.[8] To refine the analysis and understand how travel patterns vary along different parts of the Corridor, the Corridor was split into eight segments. Origin-destination data was obtained for each of the eight segments, which allowed for a robust analysis that looked at how travel patterns vary at different parts of the Corridor, as opposed to looking at the Corridor as a whole. The eight segments from North to South are:

- Hilltop Drive to Road 20
- Road 20 to Nevin Avenue/Interstate 80
- Nevin Avenue/Interstate 80 to the Alameda-Contra Costa County Line
- Alameda-Contra Costa County Line to University Avenue
- University Avenue to Ashby Avenue
- Ashby Avenue to Interstate 580
- Interstate 580 to Grand Avenue
- Grand Avenue to Frank Ogawa Plaza

Additional origin-destination data was obtained for trips that traverse the portion of Interstate 80 between University Avenue and Gilman Street to understand how travel patterns on San Pablo Avenue compare to more regional travel patterns. For brevity, the analysis of this data is not included in the main body of the Report, but can be found in Appendix G.

For each of the eight segments, auto trips were further classified into the following trip types:

[7] Origin-destination data is a dataset that provides the origin and destination of each trip in the sample, based on a pre-determined set of zones. A 50-zone system was used for this analysis and presented in Appendix G.
[8] StreetLight Data is a data analytics company transforming urban planning and transportation design with the power of geospatial data from cell phones and other GPS-enabled devices. https://www.streetlightdata.com

- ***Study Area-to-Study Area Trips***: Trips that both start and end within a ½-mile of San Pablo Avenue. These trips were identified as the target market, as they would be the most affected by improvements on the Corridor.
- ***Pass-Through Trips:*** Trips that neither start nor end along the corridor. These trips were identified as the least likely to shift modes and the most likely to shift to an alternate route if existing capacity on San Pablo Avenue was reallocated to prioritize more efficient modes, such as walking, biking, or transit.
- ***Trips to or from the Study Area:*** These are trips that either start or end in the Study Area, but have one end outside of the Study Area. Analysis was done on these trips to understand how improvements on the Corridor would affect them, however, for brevity, this analysis is not included in the main body of the Report. Refer to Appendix G for more information.

Study Area-to-Study Area trips were further analyzed to determine their potential for mode shift based on the length of their trip. Trips less than 0.5-miles in length were considered likely to switch to walking if multimodal improvements were made on the Corridor, trips between 0.5-miles and two miles were considered likely to switch to biking, and trips longer than two miles were considered likely to switch to transit. While it is expected that some trips shorter than two miles may become transit trips, and some trips longer than two miles may become bike trips, these buckets were determined to mitigate double counting and simplify analysis. The Alameda CTC Model in combination with StreetLight Data was used to determine trip lengths.

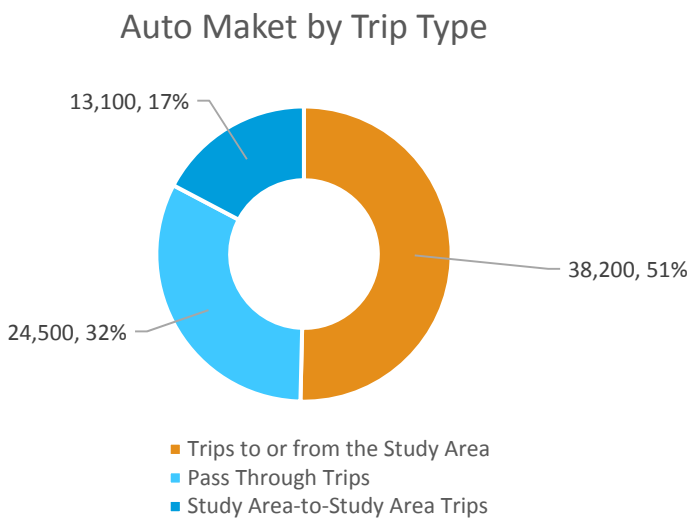
Additional data sources were used to further understand transit use and the demographics of the Corridor, including Automated Passenger Count, Automatic Vehicle Location, and California Household Travel Survey data. More information on these data sources, as well as a more detailed overall methodology is included in Appendix G.

9.3 SIZE OF THE EXISTING AUTO MARKET

The total size of the auto travel market associated with San Pablo Avenue in the morning period is over 75,800 trips. As shown in **Graph 9-2**, 17 percent, or over 13,000 trips, are Study Area-to-Study Area trips, meaning they are the target market for multimodal improvements along the San Pablo Avenue Project Corridor. These trips' travel patterns indicate that they have the highest likelihood of switching to active or transit modes in the near term. Another 32 percent of trips, or over 24,500 trips, are pass through trips, indicating that they have the potential to shift from San Pablo Avenue to an alternative route without having a negative economic impact on the Corridor if active or transportation modes are prioritized at the expense of auto capacity. Together, there are over 37,000 auto trips that could either switch modes or switch routes in the near term if multimodal improvements are implemented along San Pablo.

The remaining 51 percent, or 38,200 trips, start or end in the Study Area, but have their other trip end outside of the Study Area. These trips are unlikely to shift modes or route due to multimodal improvements on San Pablo Avenue alone, since the improvements would only address a portion of their overall trip. As a special case, trips to or from the Study Area with a trip end in San Francisco are captured under the Study Area-to-Study Area trip total to indicate that they may be converted to transit trips on BART or transbay bus service given the high levels of direct service between the Study Area and Downtown San Francisco.

Graph 9-2: Auto Market by Trip Type



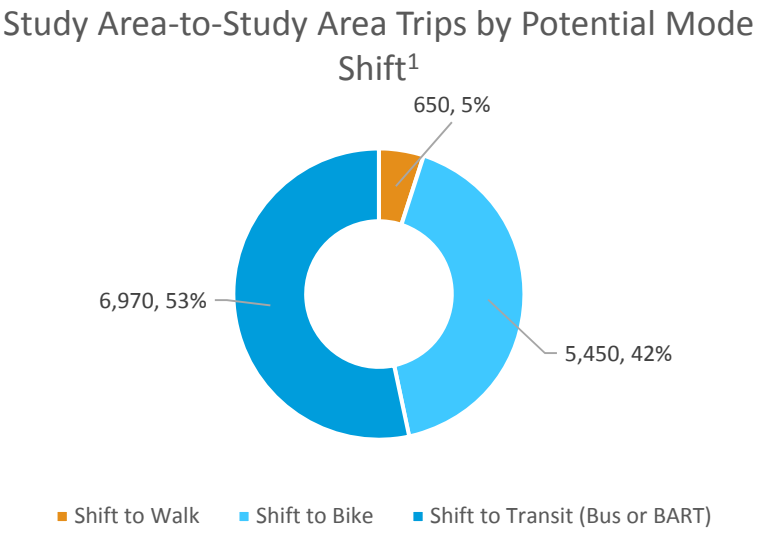
Note:

1. Number of trips shown are for both the northbound and southbound directions in the morning period.

9.4 SIZE OF THE TARGET MARKET

The target market, or Study Area-to-Study Area trips, includes over 13,000 trips. These trips have the highest potential to shift to active or transit modes in the near term. As shown in **Graph 9-3**, 53 percent of these trips, or over 6,900 trips, could shift to some form of transit, while 42 percent or over 5,400 could shift to riding a bicycle, based on trip length.

Graph 9-3: Study Area-to-Study Area Trips by Potential Mode Shift



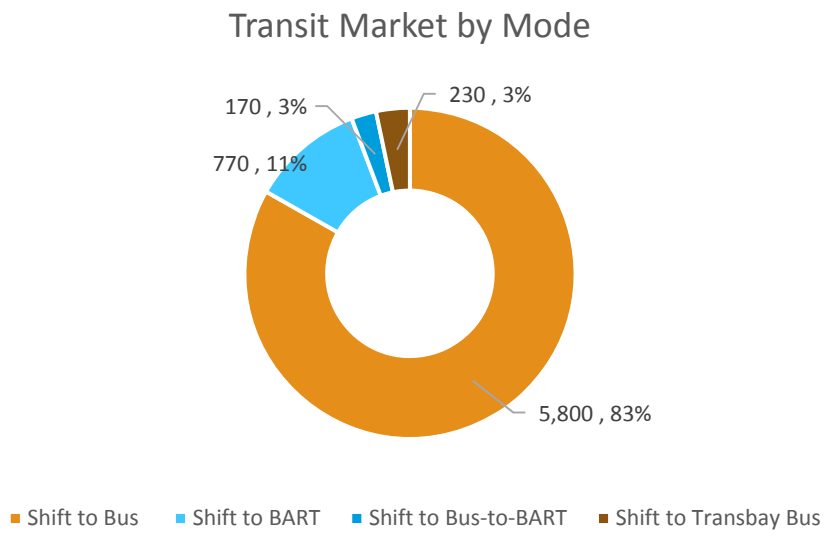
Note:

1. Number of trips shown are for both the northbound and southbound directions in the morning period.

9.4.1 POTENTIAL TRANSIT MARKET

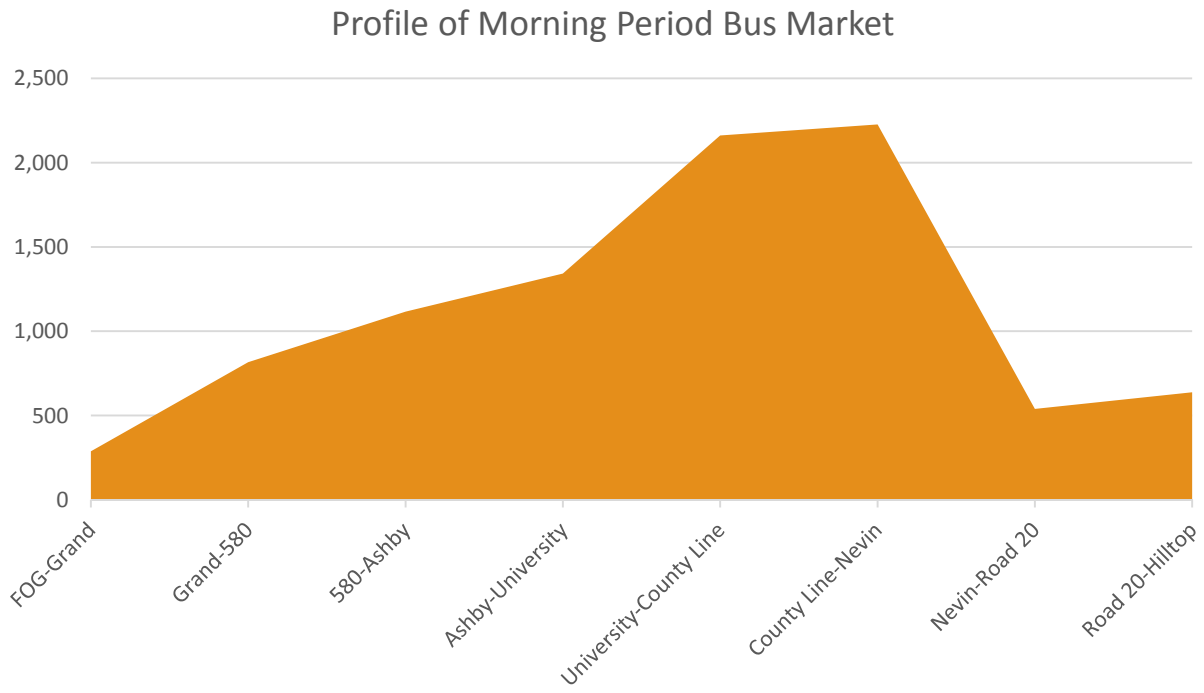
Target market trips that have the potential to shift to any mode of transit, including Rapid or local bus service, Transbay or express bus service, and BART, total more than 6,900 trips. An analysis of these trips' origins and destinations and existing transit service shows that the majority of these trips would likely shift to bus service. As shown in **Graph 9-4**, 83 percent, or approximately 5,800 trips, have the potential shift to Rapid or local bus service within the Corridor. Around 14 percent, or approximately 940 trips, have the potential to shift to BART, either by bussing to BART or directly accessing the Station. For this analysis, trips were assumed to be a potential market for BART and Transbay bus service if their trip started or ended in Downtown San Francisco and have accessibility to BART or Transbay bus service within the Study Area. The relatively small number may indicate that existing travelers traveling between Downtown San Francisco and the Study Area are already using BART.

Graph 9-4: Transit Market by Mode for the Morning Period



Graph 9-5 presents the geographic distribution of the auto trips that have the potential to shift to Rapid or local bus service. As can be seen, the market for bus trips is strongest between University Avenue and Nevin Road, with another significant market between Interstate 580 and University Avenue.

Graph 9-5: Profile of Morning Period Bus Market

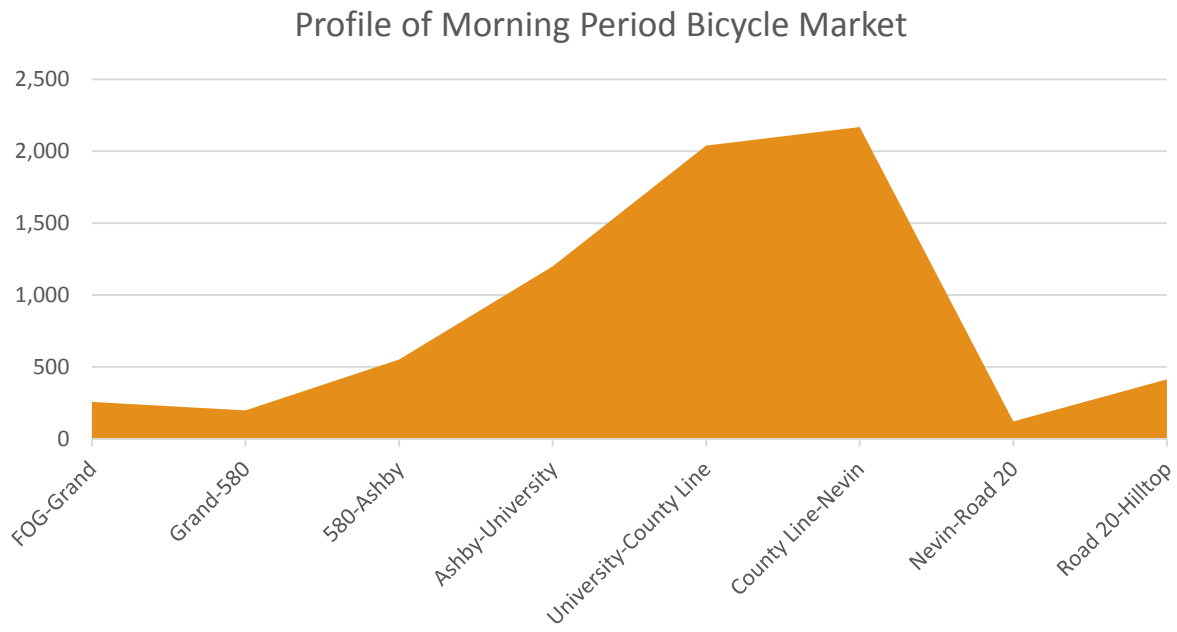


These findings indicate that focusing on improvements to bus service on San Pablo Avenue for Study Area-to-Study Area trips, rather than mimicking BART service to and from San Francisco, would have the most significant impact on mode shift to transit. They also indicate the importance of pedestrian improvements, since most bus riders would walk to access stops.

9.4.2 POTENTIAL ACTIVE TRANSPORTATION MARKET

As shown in Graph 9-3, the size of the market for walk and bike trips are 650 and over 5,400 trips, respectively. **Graph 9-6** shows that the market for bicycle trips is strongest between Ashby Avenue and Nevin Road.

Graph 9-6: Profile of Morning Period Bicycle Market



While the market for pedestrian trips is relatively small, most transit trips include walking to access transit stops. This is evident in the existing station access mode split for BART stations in the Study Area, where over 12,400 morning period BART patrons access their station via walking or biking.[9] In short, pedestrian improvements around transit are key to capturing the potential bus market noted in the previous section and continuing to support use of BART stations in the study area.

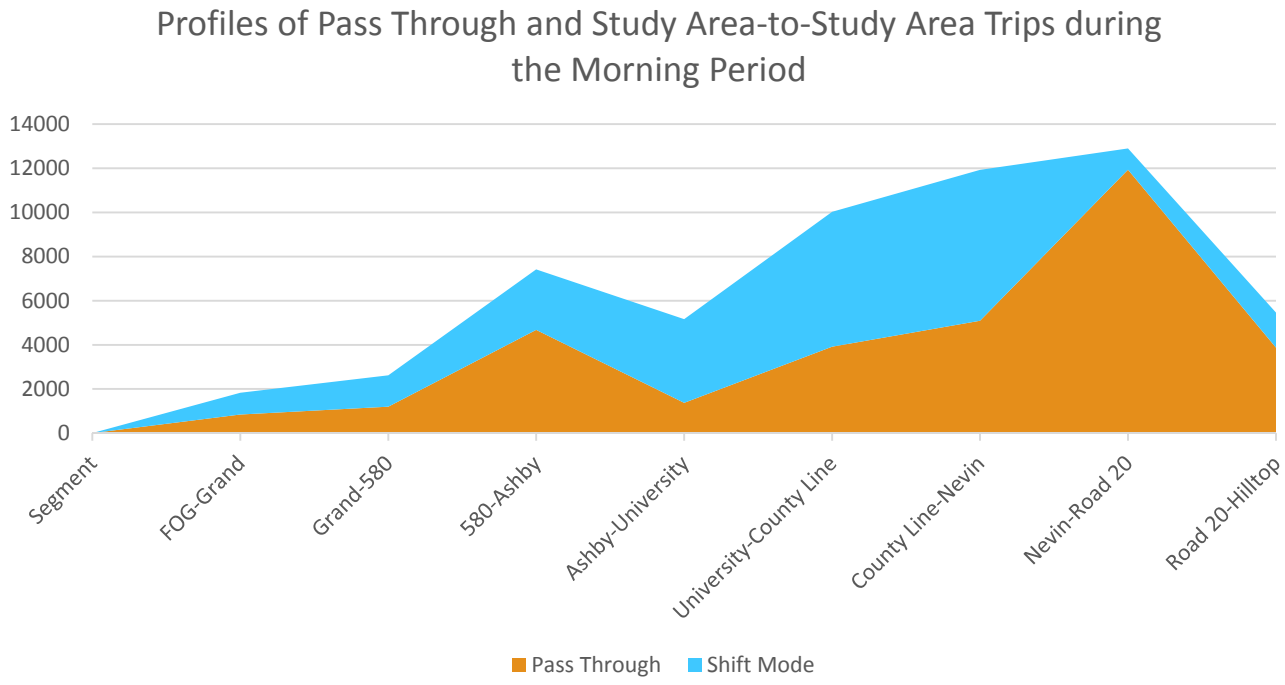
[9] More information on overall mode split for the Corridor can be found in Appendix G.

9.5 TOTAL TRIPS WITH POTENTIAL TO SHIFT MODES OR ROUTES

Understanding where high numbers of Study Area-to-Study Area trips and pass through trips overlap can show where high route shift and high mode shift potentials could combine to mitigate negative traffic operational impacts due to reallocating roadway space from vehicle right-of-way to other modes on San Pablo Avenue.

Graph 9-7 presents an overlap of the profiles of pass through and Study Area-to-Study Area trips. Conceptually, locations along the Corridor where large markets for shifting to active or transit modes and pass through trips overlap in the profile are likely to be least affected by converting auto travel lanes to active or transit modes. This is because drivers that switch modes will be removed from traffic flow and drivers that switch routes will be on other regional-serving facilities. As Graph 9-7 shows, the section of the Corridor that has the largest overlap between these two markets is between University Avenue in Berkeley and Nevin Road in Richmond. There is also a significant overlap between Interstate 580 and Ashby Avenue.

Graph 9-7: Profiles of Pass Through and Study Area-to-Study Area Trips during the Morning Period



9.6 EXISTING AUTO TRAVEL PATTERNS WITHIN THE STUDY AREA

In addition to the general profiles and size of each market noted above, understanding key travel patterns between different areas of the Corridor will provide important insight to determining where investments in multimodal improvements should be made. Error! Reference source not found. below presents the trip volumes between the major districts within the Study Area in both the northbound and southbound directions during the morning period.

TABLE 9-2: STUDY AREA-TO-STUDY AREA TRAVEL PATTERNS[1]

Origin	Destination				
	Downtown /West Oakland	North Oakland/ Emeryville	Berkeley/ Albany	El Cerrito/ Richmond Annex	Richmond /San Pablo
Downtown/West Oakland	350	180	200	110	20
North Oakland/Emeryville	380	450	500	50	20
Berkeley/Albany	390	1,000	2,050	550	50
El Cerrito/Richmond Annex	620	200	1,700	2,080	180
Richmond/San Pablo	80	10	240	480	860

Notes:

1. This includes trips travelling in the northbound and southbound direction in the morning period.

Main takeaways from this analysis include:

- There is a large number of trips that both start and end within the same district, for example the Berkeley/Albany or El Cerrito/Richmond Annex District
- There is a large number of trips between adjacent districts, for example from Berkeley/Albany to North Oakland/Emeryville or from El Cerrito/Richmond Annex to Berkeley/Albany
- A substantial portion of the Study Area-to-Study Area trips are within the Berkeley/Albany and El Cerrito/Richmond Annex districts

The large number of internal trips or trips to an adjacent district further demonstrates the significant market for shorter trips that have the potential to switch modes. Improvements targeted at short- and mid-length trips would be an appropriate match for the existing travel market. Additionally, the majority of trips clustered between Berkeley and El Cerrito indicates that improving connections to, from, and within this part of the Study Area would lead to the most significant mode shift. Appendix G provides more detail on the most significant trip pairs for all trip types.

10. LAND USE CONTEXT, URBAN DESIGN, DEMOGRAPHICS, AND ECONOMIC DEVELOPMENT

This chapter describes the land use context, urban design, and a summary of demographics and economic development along the San Pablo Avenue Corridor.

10.1 LAND USE CONTEXT

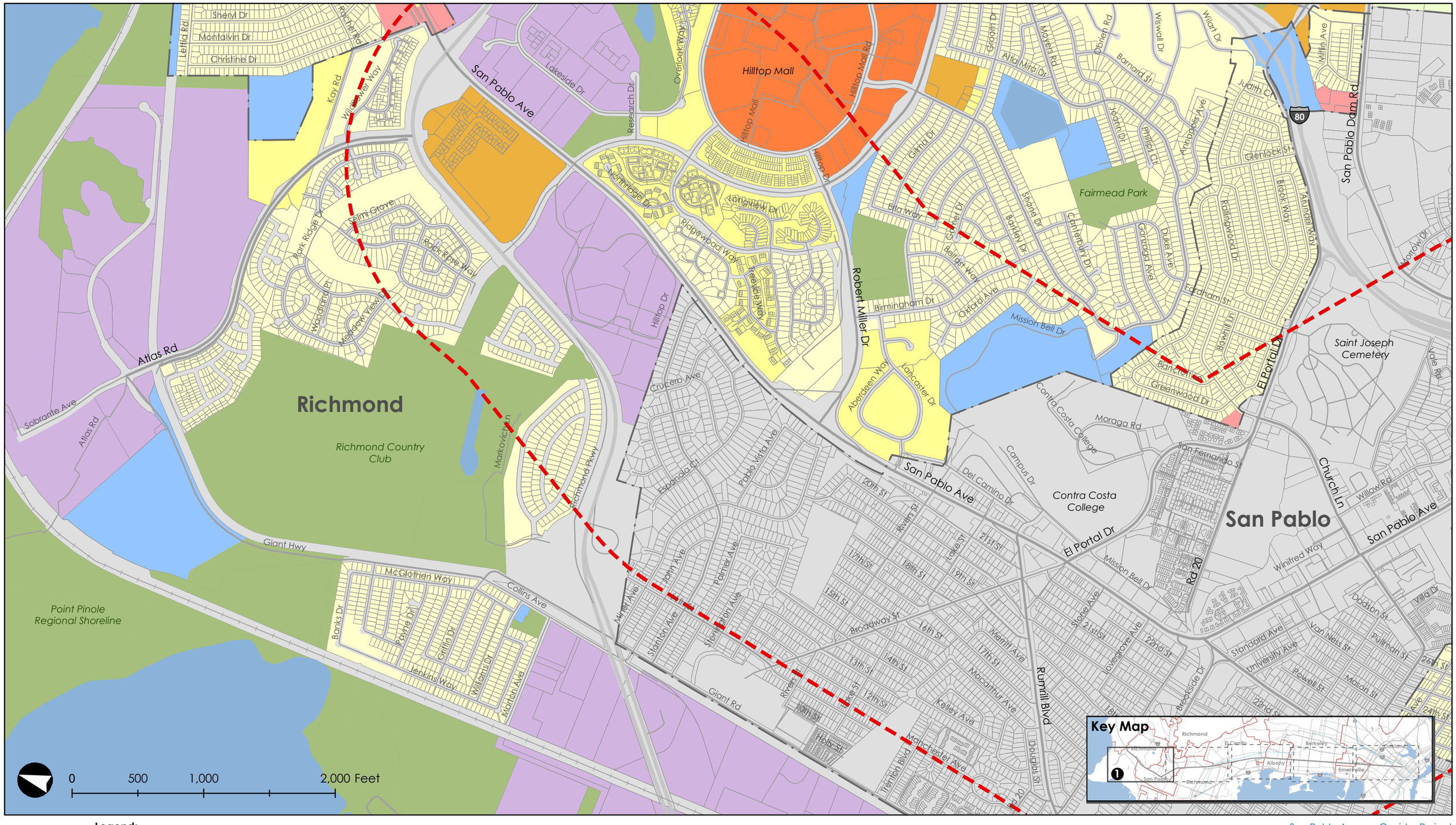
Understanding the existing and planned context of the built and natural environment along San Pablo Avenue is important because both the intensity and the mix of land uses bear a direct relationship to the mix of transportation modes needed to serve the mobility, access, and safety as well as livability needs of people who live, work, and travel along San Pablo Avenue. For example, corridor segments that serve activity centers with intensive mixed-use require access by a mix of modes with a high quality pedestrian environment, while corridor segments that serve areas along San Pablo Avenue that are largely industrial may require considerations for the accommodation of goods movement in the development of Project Concepts.

Land use context also affects specific street cross section elements, such as the presence of on-street parking and loading zones, and the width and use of the sidewalk area for pedestrian buffering, walking, outdoor seating, or the accommodation of transit stops.

10.1.1 METHODOLOGY

Jurisdictions use different terms to define their local general plan land use categories, and so mapping all locally used categories would be difficult to analyze. For this reason, a range of generalized land use context types was developed that are based on an interpretation of the different jurisdictions zoning and land use information. The land use types are generalized to reflect different densities of residential and mixed-use areas based on the planned land use definitions of each jurisdiction. Non-residential uses are generalized based upon the land use types developed for the Alameda County version of the Plan Bay Area Sustainable Community Strategy (SCS), which was used in the adopted 2012 Countywide Transportation Plan. For jurisdictions in West Contra Costa County and unincorporated areas, the non-residential uses were matched to the generalized uses in the Alameda County SCS dataset.

In a final step, Activity Centers were superimposed on the generalized planned land uses, to reflect existing and planned centers based on a review of current local land use policy, Priority Development Area designations (see Section 10.2), and existing use analysis. The four types of Activity Centers identified in **Figure 10-1** include the following:



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Planned Land Uses

- City Center Mixed Use
- High Intensity Mixed Use/ Mixed Use Center
- Mixed Use/ Mixed Use Corridor
- Commercial
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Very Low Density Residential
- Industrial
- Education/ Public/Semi-Public
- Agriculture/ Resource Extraction
- Activity Centers

Note: Electronic land use data for the City of San Pablo was not readily-available and is therefore not shown in this figure.

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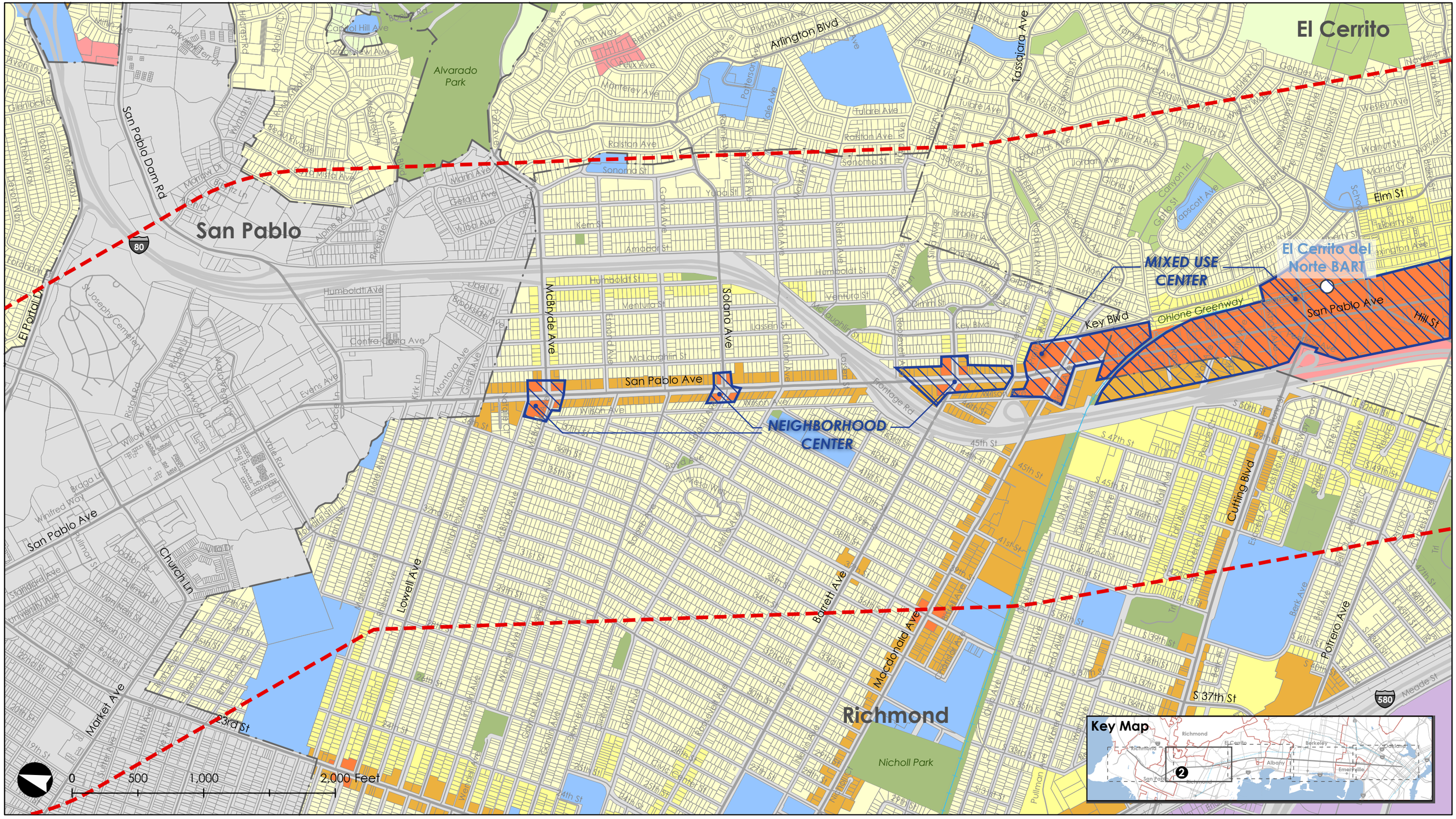
San Pablo Avenue Corridor Project

Figure 10-1.1 Generalized Planned Land Use

San Pablo Corridor between City of Richmond boundary and Church Lane

November 17, 2017



Legend:

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- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Planned Land Uses

- City Center Mixed Use
- High Intensity Mixed Use/ Mixed Use Center
- Mixed Use/ Mixed Use Corridor
- Commercial
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Very Low Density Residential
- Industrial
- Education/ Public/Semi-Public
- Agriculture/ Resource Extraction
- Activity Centers

Note: Electronic land use data for the City of San Pablo was not readily-available and is therefore not shown in this figure.

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San Pablo Avenue Corridor Project

Figure 10-1.2 Generalized Planned Land Use

San Pablo Corridor between Church Lane and Potrero Avenue

November 17, 2017

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Planned Land Uses

- City Center Mixed Use
- High Intensity Mixed Use/ Mixed Use Center
- Mixed Use/ Mixed Use Corridor
- Commercial
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Very Low Density Residential
- Industrial
- Education/ Public/Semi-Public
- Agriculture/ Resource Extraction
- Activity Centers

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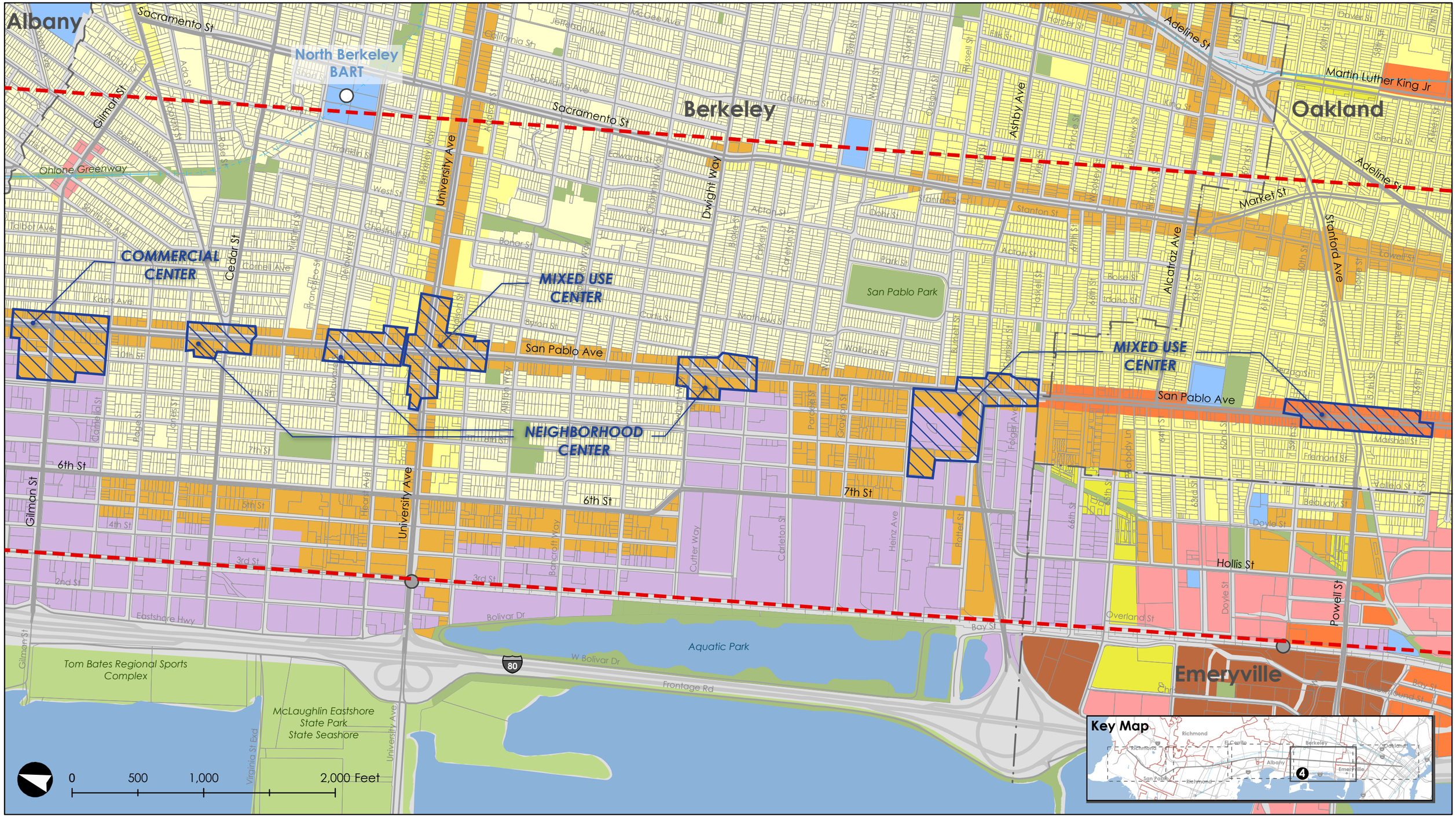
San Pablo Avenue Corridor Project

Figure 10-1.3 Generalized Planned Land Use

San Pablo Corridor between Potrero Avenue and Gilman Street

November 17, 2017



Legend:

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- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Planned Land Uses

- City Center Mixed Use
- High Intensity Mixed Use/ Mixed Use Center
- Mixed Use/ Mixed Use Corridor
- Commercial
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Very Low Density Residential
- Industrial
- Education/ Public/Semi-Public
- Agriculture/ Resource Extraction
- Activity Centers

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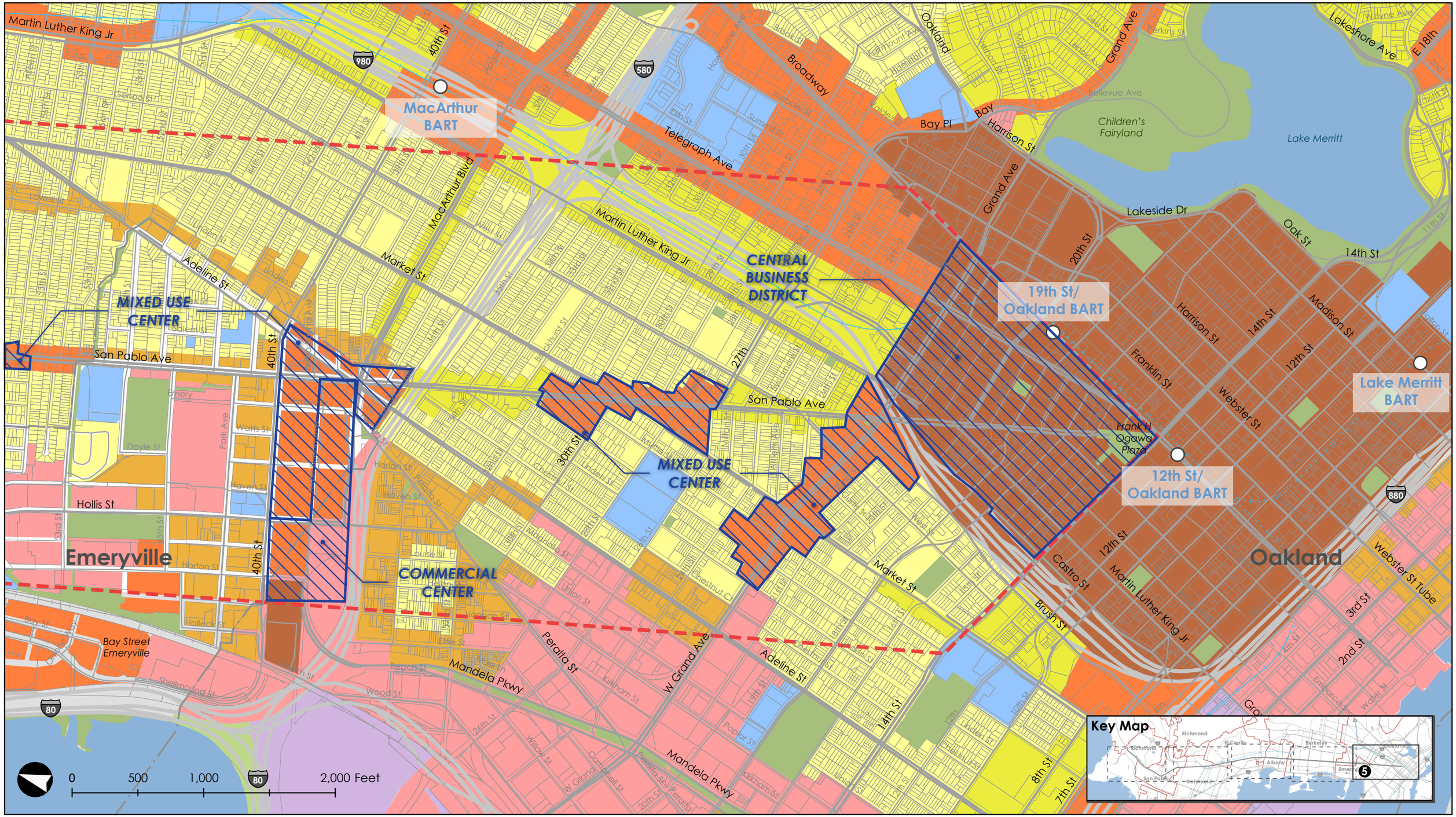
San Pablo Avenue Corridor Project

Figure 10-1.4 Generalized Planned Land Use

San Pablo Corridor between Gilman Street and City of Emeryville boundary

November 17, 2017



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Planned Land Uses

- City Center Mixed Use
- High Intensity Mixed Use/ Mixed Use Center
- Mixed Use/ Mixed Use Corridor
- Commercial
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Very Low Density Residential
- Industrial
- Education/ Public/Semi-Public
- Agriculture/ Resource Extraction
- Activity Centers

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San Pablo Avenue Corridor Project

Figure 10-1.5 Generalized Planned Land Use

San Pablo Corridor between City of Emeryville Boundary and Frank Ogawa Plaza

November 17, 2017

- **Central Business District:** defined as urban area with the relatively highest intensity and mix of uses (Downtown Oakland).
- **Mixed-Use Center:** defined as a center for economic and community activity that includes a significant component of residential uses.
- **Commercial Center:** defined as a regional-serving center of economic and community activity, and more emphasis on retail and employment use, compared with residential use.
- **Neighborhood Center:** defined as a neighborhood-serving center of economic and community activity; these are generally less intensive compared with the other Activity Center types.

10.1.2 CORRIDOR LAND USE CONTEXT AND ACTIVITY CENTERS

Figure 10-1 illustrates that based on the generalized Land Use Context most local jurisdictions view the area along San Pablo Avenue (Study Area) as an area that will develop into a continuous mixed-use corridor of varying intensity; a variety of different types of activity centers occur along the length of San Pablo Avenue.

There are a few notable exceptions to this pattern: (1) the industrial and residential areas at the northernmost end of San Pablo Avenue in the city of Richmond (these areas are separated from San Pablo Avenue by an embankment); (2) the commercial area south of Central Avenue in El Cerrito and in Albany near Marin Avenue; and (3) corridor segments lined by residential development in the City of Oakland between 35th and 32nd Streets and 27th and 23rd Streets.

10.1.3 KEY FINDINGS

Significant portions of Study Area fall into mixed-use land use categories with varying levels of intensity. The most intensive nodes have been identified as Activity Centers where the mix and intensity of uses would be best served by a high-quality pedestrian environment that supports access by transit, parking once (by vehicle or bicycle), or walking from surrounding neighborhoods to access and enjoy the range of commercial, social, and other uses in these Activity Centers. In addition to more emphasis on pedestrian infrastructure and level of transit service within the Central Business District and Mixed-Use Centers, these locations are likely the best candidates for implementation of parking management and bicycle parking facilities. Commercial Centers, particularly those with larger grocery stores and other large retail establishments, will likely have more delivery/truck access and parking needs. Neighborhood Centers will have more pedestrian activity and may also be accessed to a greater degree by people cycling from surrounding neighborhoods. These centers can also support more transit ridership, as transit riders can take advantage of the neighborhood services while walking to and from transit. Some areas with the most intensive uses, especially where right-of-way is limited, may have competing needs with

respect to modal priorities and place-making that will need to be evaluated during the development of alternatives.

10.2 PRIORITY DEVELOPMENT AREAS

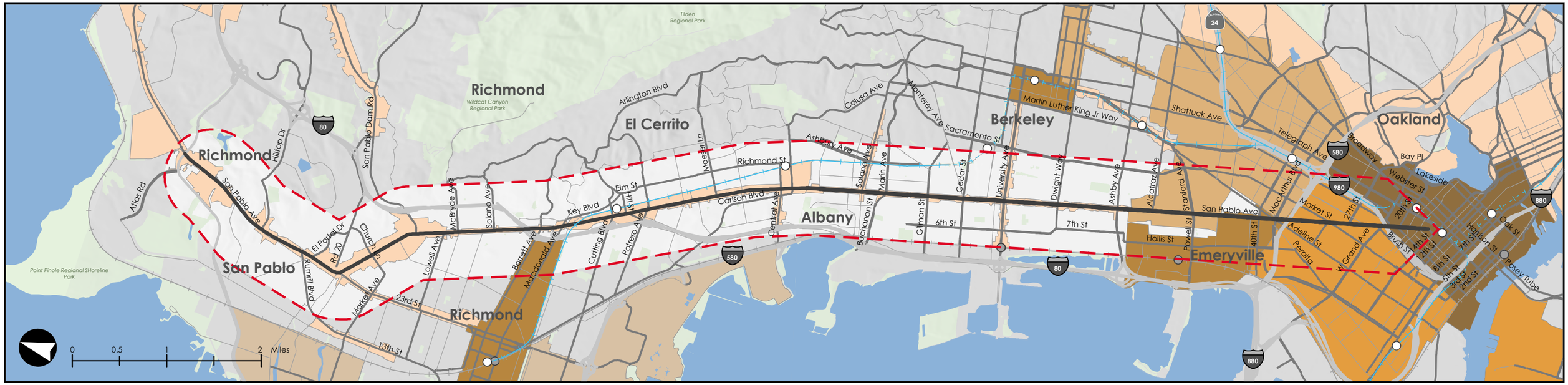
The *2040 Plan Bay Area*, adopted by the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) in July of 2017, includes the designation of places as Priority Development Areas (PDAs). PDAs are defined as locally identified opportunity areas for investment, new homes, and job growth and under *Plan Bay Area* form a critical part of the foundation for sustainable regional growth of the Bay Area as a whole.

Because of its importance as a major transit corridor in the East Bay, all of San Pablo Avenue bordered by areas that have been designated as a PDA by local jurisdictions. **Figure 10-2** provides an overview of the location and extent of PDAs along San Pablo Avenue. Following the Plan Bay Area's nomenclature, the map also distinguishes between the five different types of PDAs[10] that occur along the Corridor:

- **Regional Center**: Primary centers of economic and cultural activity with a dense mix of employment, housing, retail and entertainment that caters to regional markets (e.g. Downtown Oakland).
- **City Center:** Magnets for surrounding areas & commuter hubs to the region (e.g. Emeryville).
- **Transit Town Center:** Local-serving centers of economic and community activity (e.g. West Oakland).
- **Urban Neighborhood:** Residential areas with strong regional connections, moderate-to-high densities, and local-serving retail mixed with housing.
- **Mixed-Use Corridor:** Areas of economic and community activity with rail, streetcar, or high frequency bus service that lack a distinct center.

As shown on Figure 10-2, approximately three quarters of the length of San Pablo Avenue fall into the Mixed-Use Corridor PDA type.

[10] Alameda County Priority Development Area Investment and Growth Strategy, Alameda County Transportation Commission, May 2017.



San Pablo Avenue Corridor Project

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Priority Development Areas*

- Mixed Use Corridor
- Transit Neighborhood
- Urban Neighborhood
- Transit Town Center
- City Center
- Regional Center

*Definition of PDA Types per: Alameda County Priority Development Area Investment and Growth Strategy, Alameda County Transportation Commission, May 2017.

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Figure 10-2 Priority Development Areas

November 17, 2017

10.2.1 PRIORITY DEVELOPMENT AREAS ALONG SAN PABLO AVENUE

Following is an overview (from north to south) of each PDA's planning status, primary applicable local planning document, PDA size, and place type. The presented information was taken from the Priority Development Area Showcase website (http://gis.abag.ca.gov/website/PDAShowcase/):

- **Richmond – WCCTAC San Pablo Avenue**
  - NORTHERN END: from Richmond Parkway/City Limit to Lancaster Drive/City Limit
  - CENTRAL: from Lowell Avenue/City Limit to Bissen Avenue/City Limit
  - SOUTHERN END; west side of San Pablo Avenue only: from Jefferson Avenue to El Dorado Avenue/City Limit

Plan Status	planned
Primary Planning Document	none
Net acres	170
Future Place Type	Mixed-Use Corridor

* The City of Richmond prepared the Richmond Livable Corridors Form Based Code, which also covers properties along San Pablo Avenue. In 2016, portions of this code were integrated into the City's zoning.

- **San Pablo – San Pablo Avenue & 23rd Street Corridors (from Stanton Avenue to Lowell Avenue/City Limit)**

Plan Status	planned
Primary Planning Document	San Pablo Avenue Specific Plan (2011)
Net acres	218
Future Place Type	Mixed-Use Corridor

- **El Cerrito – San Pablo Avenue**
  - NORTHERN END from MacDonald Avenue/City limit to north of Schmidt Lane

Plan Status	planned
Primary Planning Document	San Pablo Avenue Specific Plan
Net acres	87
Future Place Type	Mixed-Use Corridor

  - SOUTHERN END – mostly on east side of San Pablo Avenue: from north of Schmidt Lane to Kains Avenue/City Limit

Plan Status	planned
Primary Planning Document	San Pablo Avenue Specific Plan
Net acres	96
Future Place Type	Mixed-Use Corridor

* The San Pablo Avenue Specific Plan (City of El Cerrito document) was prepared with substantial input from and participation by the City of Richmond.

- **Albany – San Pablo Avenue & Solano Mixed-Use Neighborhood (from Kains Avenue to north of Harrison Street/City Limit)**

Plan Status	not started
Primary Planning Document	none
Net acres	55
Future Place Type	Mixed-Use Corridor

- **Berkeley – San Pablo Avenue (from north of Harrison Street/City Limit to 67th/Haskell Street)**

Plan Status	planned
Primary Planning Document	West Berkeley Plan (2000)
Net acres	72
Future Place Type	Mixed-Use Corridor

- **Oakland – Golden Gate/North Oakland (from 67th/Haskell Street to 53rd Street)**

Plan Status	not started
Primary Planning Document	none
Net acres	714
Future Place Type	Urban Neighborhood

- **Emeryville – Mixed-Use Core (from 53rd Street to I-580 Overpass)**

Plan Status	planned
Primary Planning Document	General Plan (2009)
Net acres	451
Future Place Type	City Center

- **Oakland – West Oakland (from I-580 Overpass to I-980 Overpass)**

Plan Status	planned
Primary Planning Document	West Oakland Specific Plan, Oakland General Plan Land Use & Transportation Element (LUTE)- West Oakland Area View (1998)
Net acres	1,163
Future Place Type	Transit Town Center

- **Oakland – Downtown & Jack London Square (from I-980 Overpass to Frank Ogawa Plaza)**

Plan Status	planned
Primary Planning Document	Lake Merritt BART Station Area Plan, General Plan (1998)
Net acres	865
Future Place Type	Regional Center

10.2.2 KEY FINDINGS

The fact that all segments of San Pablo Avenue fall into or are at the center of a Priority Development Area could represent an opportunity for identifying funding sources for the implementation of Project Concepts identified in future Project tasks. The presence of these PDA designations will also support, and could attract funding for, further development of local land use policies and specific plans that would support multimodal infrastructure investments that will be recommended by this project.

The fact that El Cerrito has already identified concrete improvement concepts for the segment of San Pablo Avenue that falls into the PDA in this jurisdiction, creates both opportunities and challenges. Opportunities present themselves where Project Concepts are in sync with improvements identified in the adopted San Pablo Avenue Specific Plan, whereas challenges could arise from Project Concepts that significantly depart from the locally identified vision for the San Pablo Avenue Corridor, such as curb extensions and new medians that may pose some limits on the long-term introduction of dedicated BRT lanes depending on the overall cross section of the street.

10.3 URBAN DESIGN

The assessment of the urban design character along San Pablo Avenue will help to inform where future investment in improvements for people walking can be most effective in increasing walking activity and supporting pedestrian safety. Such investments are most effective if made with an understanding of where and how land use policies support the creation of Activity Centers and the location of existing and future places and nodes with a more intensive mix of uses (but without an Activity Center designation).

The quality of the pedestrian realm along a major transportation corridor like San Pablo Avenue is mainly defined by three main factors:

- The extent to which the design of sidewalk-adjacent frontages of buildings and site conditions support pedestrian activity and a comfortable walking environment, including people walking or using sidewalk-adjacent open space/outdoor seating.
- The quality of the Streetscape environment, including:
  - The presence of street trees and other landscaping on sidewalks and the extent to which pedestrians and related activities that occur on sidewalks are buffered from exposure to moving traffic on the roadway. Trees and landscaping in medians are of lesser importance in this context but can still contribute to a positive aesthetic streetscape environment.
  - The lighting conditions on the sidewalk, in particular the presence of pedestrian-scale lighting specifically designed to achieve lighting levels that increase pedestrian safety and comfort.

10.3.1 LAND USE FRONTAGE

10.3.1.1 Methodology

In order to identify segments of San Pablo Avenue where existing land use frontages and site conditions make a positive contribution to the quality of the pedestrian realm by supporting pedestrian activities and walking the following types of land use frontages were mapped:

Frontages that Activate the Sidewalk and Support a Comfortable Walking Environment

- Active Building Frontage: defined as buildings whose frontage along San Pablo Avenue includes frequent entries to retail, service, commercial or civic uses and significant ground floor windows that provide a visual connection between the activity inside the building and people walking along the street.
- Semi-Active Building Frontage: defined as buildings whose frontage has the same basic characteristics as buildings in the Active Frontage category, but that are currently not occupied or not occupied by a use that takes advantage of existing doors and windows (i.e.; window shades or other improvements make windows opaque).
- Open Space: defined as frontages of sidewalk-adjacent Landscaped Plazas, Pocket Parks, Ohlone Greenway segments.

Inactive Frontages that Support Some Aspects of a Comfortable Walking Environment

- Buffered Parking Lots and Yards of Auto-Oriented Uses: defined as surface parking lots, gas station areas, yards of auto repair shops etc. that are separated from the sidewalk by a maintained landscaped buffer, low wall, or low, decorative fence.
- Landscaped Setbacks: defined as maintained, landscaped setbacks between buildings and the back of sidewalk.
- Vegetated Embankment: defined as sloping roadside areas planted with vegetation. This condition occurs in the City of San Pablo along a segment of San Pablo Avenue that current lacks a sidewalk or other pedestrian facility. This frontage condition is shown under this category as it has the potential to support a comfortable walking environment if a well-lit and safe sidewalk or multi-use path was introduced along the street.

Inactive Frontages that Do Not Support a Comfortable Walking Environment

- Inactive Building Frontages: defined as buildings dominated by blank walls or buildings designed to provide privacy at the ground floor level (residential buildings without landscaped setbacks or front yards) or otherwise discourage a

visual sense of connection between building occupants and pedestrians on sidewalks.

- Unbuffered Parking Lots and Yards of Auto-oriented Uses: defined as surface parking lots, gas station areas, yards of auto repair shops etc. that lack any separation from the sidewalk.
- Tall Fences / Vacant Land: defined as frontages dominated by tall, chain-link type fences and frontages of undeveloped vacant land.

It is important to keep in mind that the land use frontage condition is just one of several factors that determine the quality of the pedestrian realm along a street. For instance, the Streetscore+ analysis determine pedestrian comfort based on variety of factors, including the presence and continuity of sidewalks or the buffering of pedestrians from moving traffic by landscaping/street trees. The land use frontage mapping supplements the Streetscore+ mapping by providing information about the character and quality with which buildings and sites engage the edge of the sidewalk along the property line. These building and site conditions have a relationship to the attractiveness of an area for people walking in relation to an engaging and comfortable context and accessibility to uses on properties adjacent to San Pablo Avenue. Both sets of information look at different characteristics of a comfortable walking environment, therefore they have to be viewed together in order to gain a complete understanding of the quality of the environment for people who spend a part of their trip walking along San Pablo.

10.3.1.2 Land Use Frontage Conditions

Figure 10-3 shows the existing land use frontage conditions along the length of San Pablo Avenue. The map illustrates that in contrast to the fairly homogenous designation of San Pablo Avenue as a mixed-use corridor this is not reflected in the quality of the land use frontages as active and inactive frontages frequently alternate along the length of San Pablo Avenue. Similarly, landscaped setbacks and buffered parking lots occur just as frequently as unbuffered parking lots and other types of frontages that are not supportive of a comfortable walking environment.

However, some segments, such as that through Albany, shorter sections of San Pablo Avenue in Berkeley and Emeryville, as well as the southern end of San Pablo Avenue (south of West Grand Avenue) in Oakland include more consistent stretches of active (or semi-active) and pedestrian supportive land use frontages.

Only in some cases does the mapping show a stronger correlation between pedestrian-friendly land use frontages and the identified Activity Centers (see Figure 10-3).

10.3.1.3 Key Findings

The results of the Land Use Frontage mapping can help identify segments or sub-segments of San Pablo Avenue that could benefit from transforming semi-active frontages into active frontages. In particular, activity centers where frontage conditions are poor. This could form the basis of a larger public-private strategy that could also address the upgrading of sidewalk-adjacent, unbuffered parking lots to include a pedestrian-friendly landscape or other buffer. Such efforts could be combined with

Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Frontages that Activate the Sidewalk and Support a Comfortable Walking Environment

- Active Building Frontage
- Semi-Active Building Frontage
- Open Space

Inactive Frontages that Support Some Aspects of a Comfortable Walking Environment

- Buffered Parking Lots and Yards of Auto-oriented Uses
- Landscaped Setbacks
- Landscaped Embankment

Inactive Frontages that do not Support a Comfortable Walking Environment

- Inactive Building Frontage
- Unbuffered Parking Lots and Yards of Auto-oriented Uses
- Tall Fences/Vacant Land

- Activity Centers

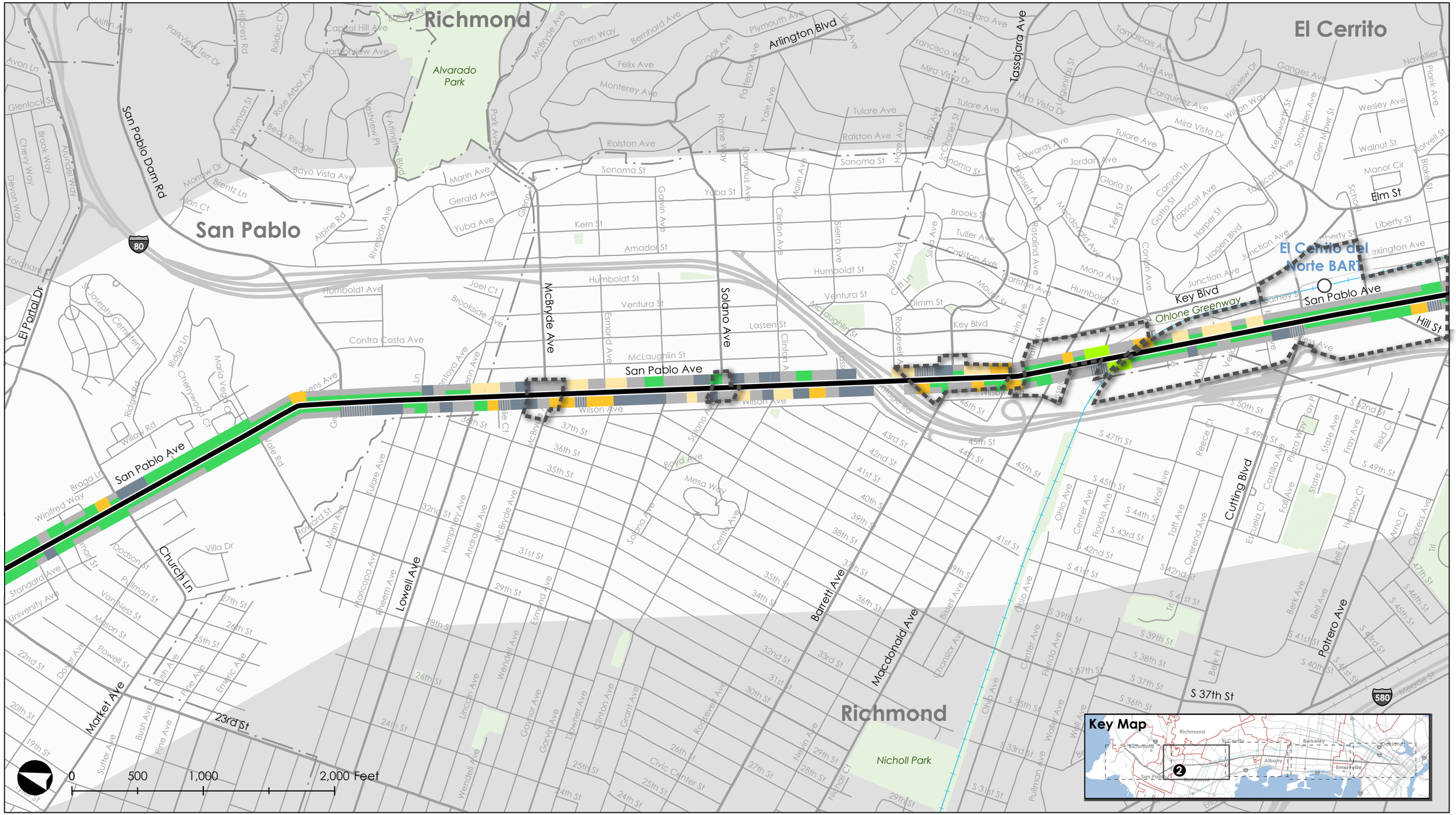
ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 10-3.1 Land Use Frontage Conditions

San Pablo Corridor between City of Richmond boundary and Church Lane

December 2017



Legend:

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Frontages that Activate the Sidewalk and Support a Comfortable Walking Environment

- Active Building Frontage
- Semi-Active Building Frontage
- Open Space

Inactive Frontages that Support Some Aspects of a Comfortable Walking Environment

- Buffered Parking Lots and Yards of Auto-oriented Uses
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Inactive Frontages that do not Support a Comfortable Walking Environment

- Inactive Building Frontage
- Unbuffered Parking Lots and Yards of Auto-oriented Uses
- Tall Fences/Vacant Land

- Activity Centers

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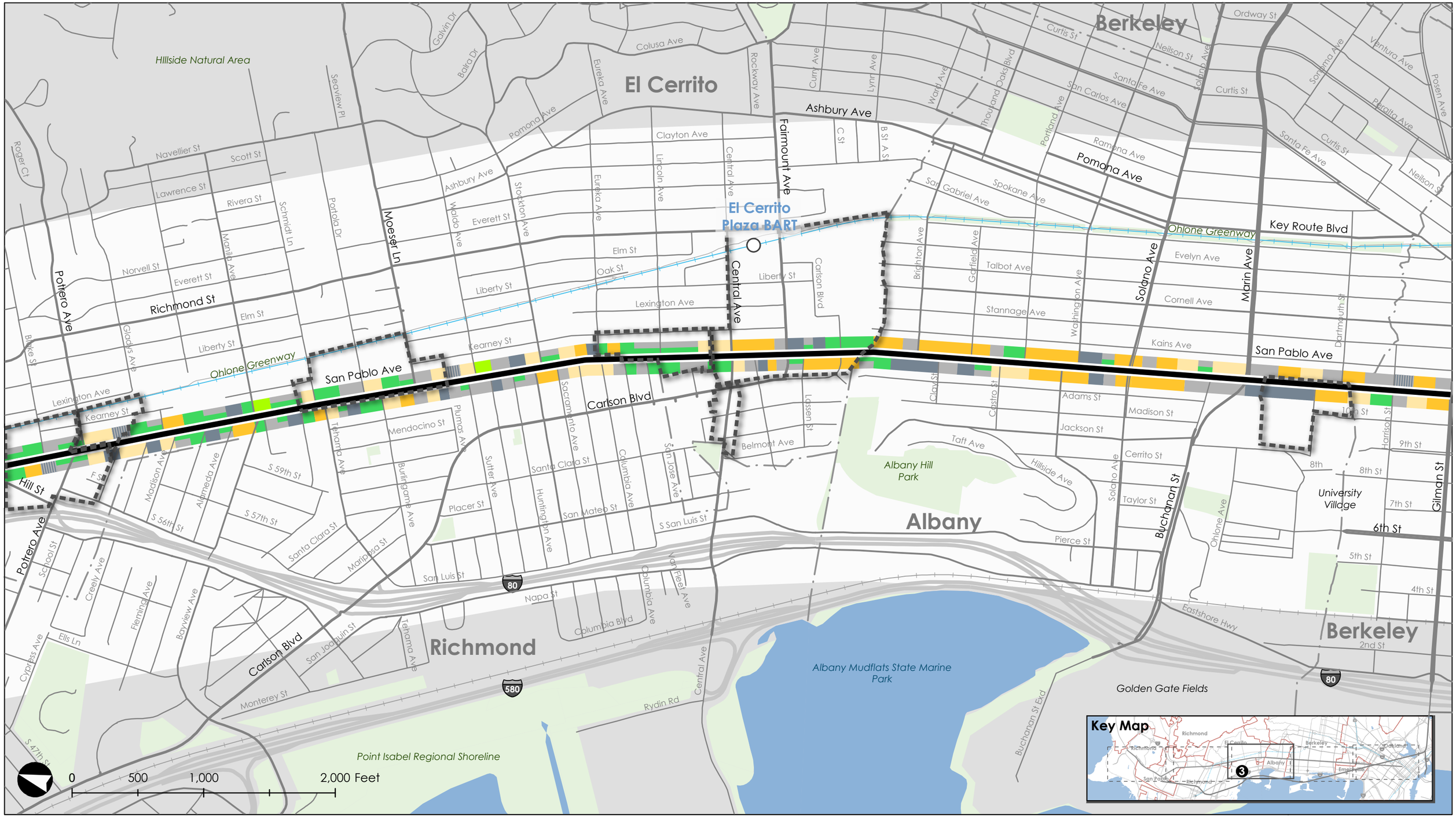
San Pablo Avenue Corridor Project

Figure 10-3.2 Land Use Frontage Conditions

San Pablo Corridor between Church Lane and Potrero Avenue

December 2017



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- Landscaped Embankment

Inactive Frontages that do not Support a Comfortable Walking Environment

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- Unbuffered Parking Lots and Yards of Auto-oriented Uses
- Tall Fences/Vacant Land

- Activity Centers

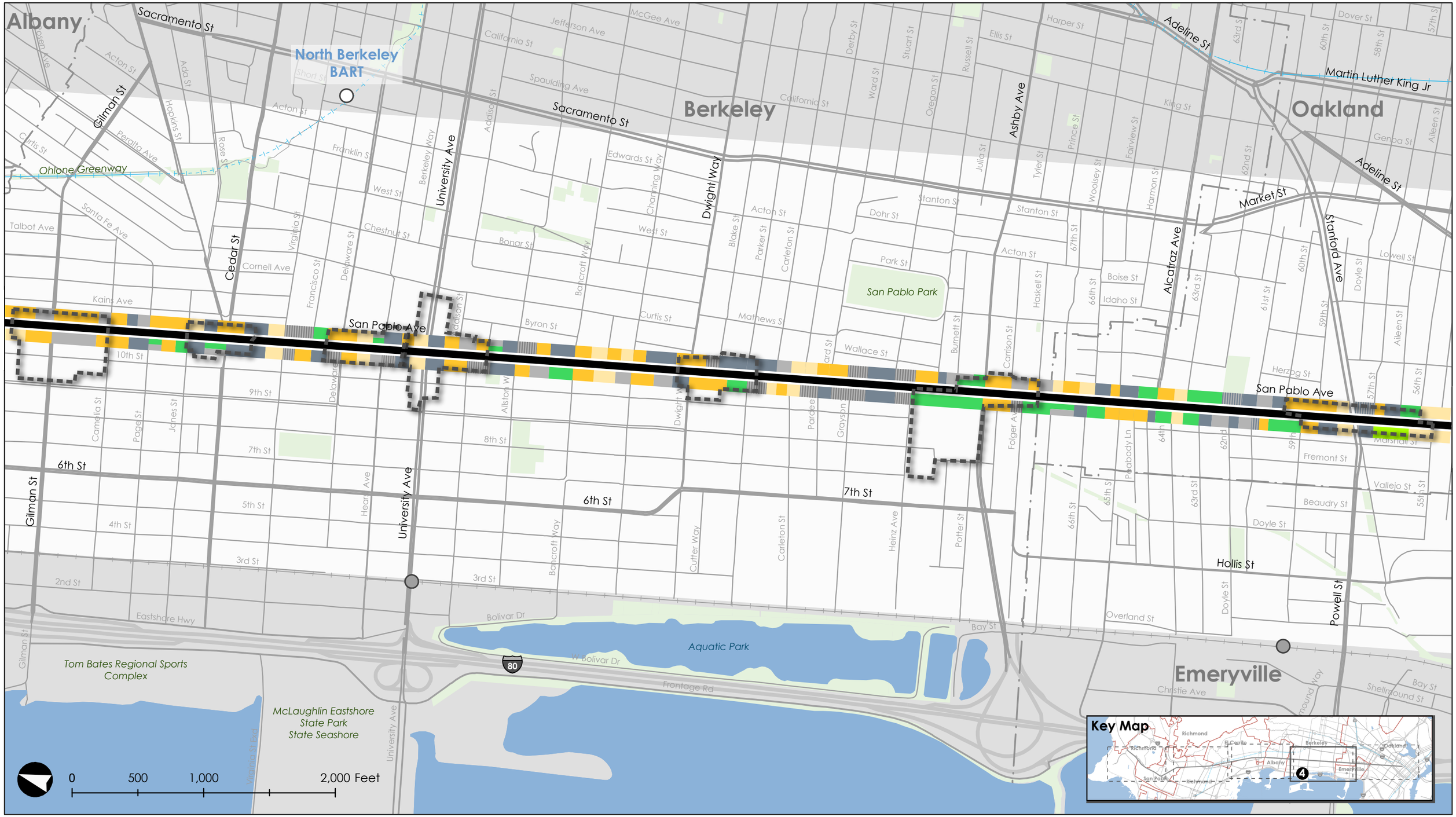
ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 10-3.3 Land Use Frontage Conditions

San Pablo Corridor between Potrero Avenue and Gilman Street

December 2017



Legend:

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Frontages that Activate the Sidewalk and Support a Comfortable Walking Environment

- Active Building Frontage
- Semi-Active Building Frontage
- Open Space

Inactive Frontages that Support Some Aspects of a Comfortable Walking Environment

- Buffered Parking Lots and Yards of Auto-oriented Uses
- Landscaped Setbacks
- Landscaped Embankment

Inactive Frontages that do not Support a Comfortable Walking Environment

- Inactive Building Frontage
- Unbuffered Parking Lots and Yards of Auto-oriented Uses
- Tall Fences/Vacant Land

- Activity Centers

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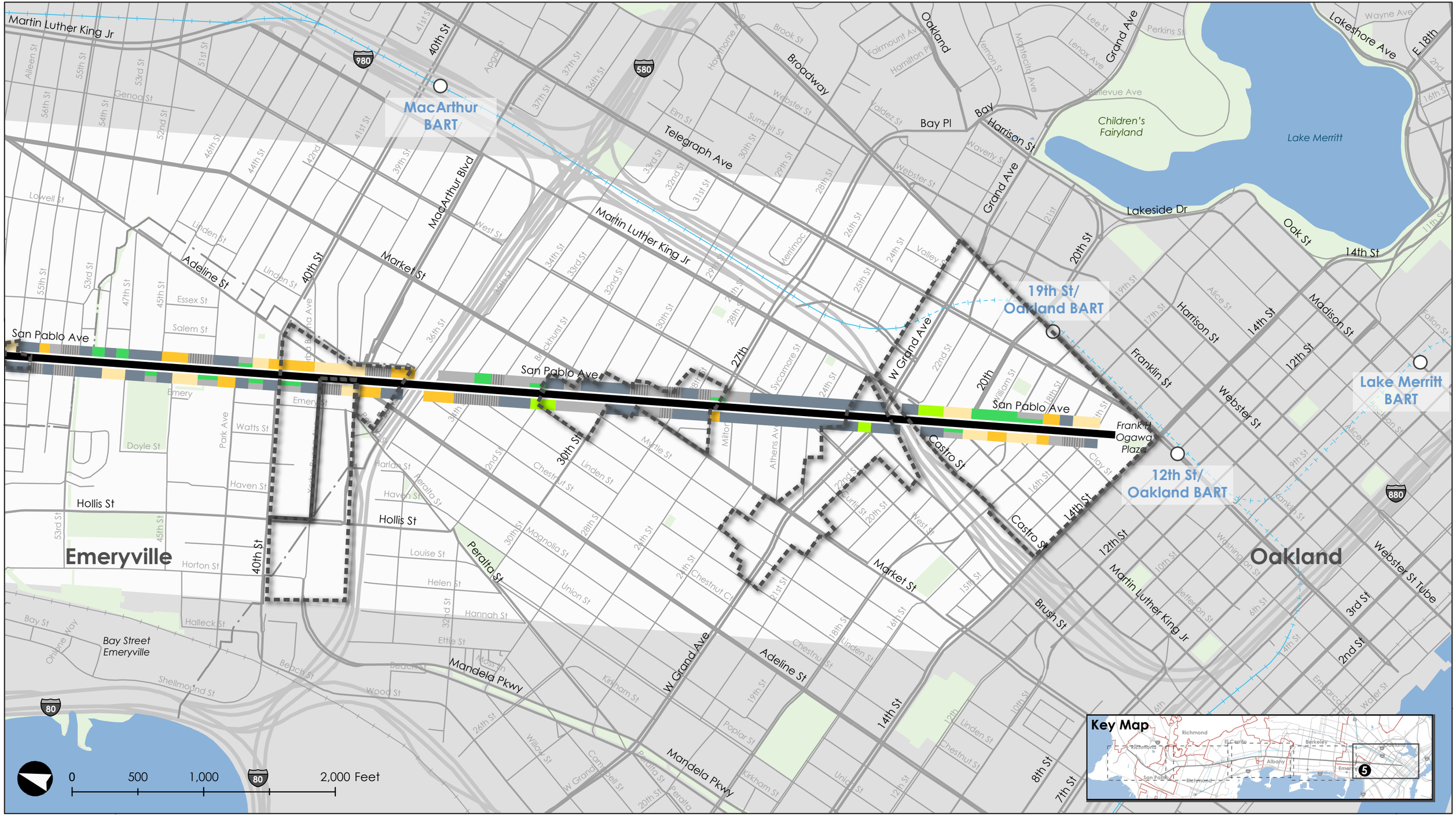
San Pablo Avenue Corridor Project

Figure 10-3.4 Land Use Frontage Conditions

San Pablo Corridor between Gilman Street and City of Emeryville boundary

December 2017



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Frontages that Activate the Sidewalk and Support a Comfortable Walking Environment

- Active Building Frontage
- Semi-Active Building Frontage
- Open Space

Inactive Frontages that Support Some Aspects of a Comfortable Walking Environment

- Buffered Parking Lots and Yards of Auto-oriented Uses
- Landscaped Setbacks
- Landscaped Embankment

Inactive Frontages that do not Support a Comfortable Walking Environment

- Inactive Building Frontage
- Unbuffered Parking Lots and Yards of Auto-oriented Uses
- Tall Fences/Vacant Land

- Activity Centers

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San Pablo Avenue Corridor Project

Figure 10-3.5 Land Use Frontage Conditions

San Pablo Corridor between City of Emeryville Boundary and Frank Ogawa Plaza

December 2017

improvements of the streetscape, which together determine the quality of the pedestrian realm.

Also, the identification of segments with concentrations of currently Active Frontages can help in determining locations for near-term pedestrian improvements as a part of this Project.

10.3.2 STREETSCAPE TREATMENTS

10.3.2.1 Rows of Street Trees and Planter Strips in Sidewalks

Rows of street trees, whether planted in individual tree wells or in planter strips located between curb and sidewalk, provide multiple benefits, such as the buffering of pedestrians from moving traffic, providing summer shade, creating a pleasing streetscape aesthetic, and providing environmental benefits that include the reduction of some air pollutants, storm water retention, and the urban heat island effect.

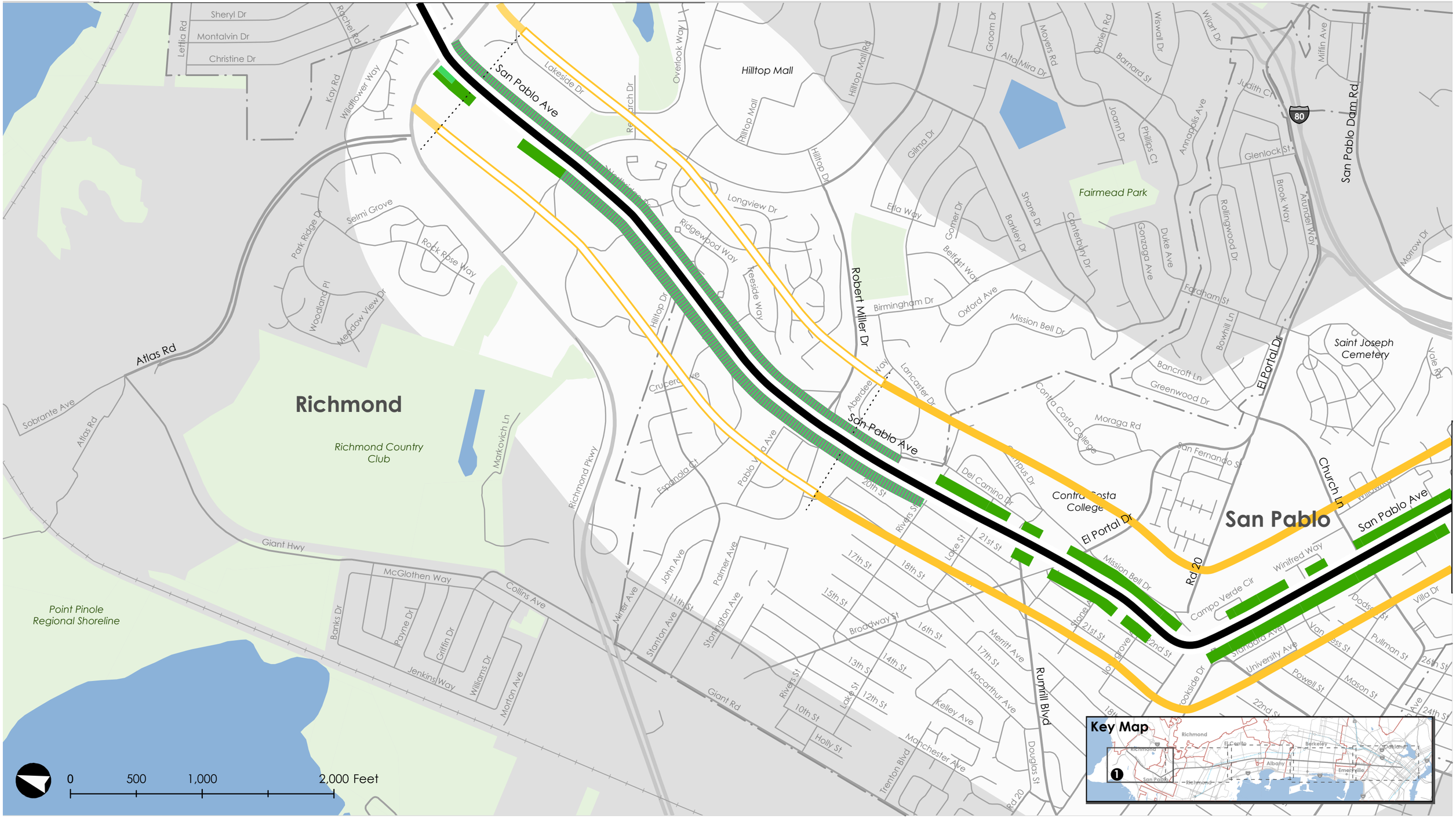
Trees also visually narrow the apparent width of the roadway, which can support design efforts to create an environment that fosters lower driving speeds.

Finally, rows of street trees set the basic rhythm for other streetscape elements, such as pedestrian-scale lighting, landscape planters, street furniture and other design elements that combine to create a sense of place and community identity.

With regard to the buffer function of sidewalk trees and planting strips, it should be noted that on-street parking lanes also provide a separation between sidewalks and moving traffic within the roadway. Please refer to Chapter 6 – Parking and Figure 6-1 for an overview of segments of the Corridor where the presence of an on-street parking contributes to the buffering of pedestrians walking on sidewalks or of other pedestrian activities, such as café seating.

Figure 10-4 provides an overview of where rows of street trees and/or planter strips are present along the edge of sidewalk on San Pablo Avenue and relative to the identified Activity Centers. The map does not reflect the presence of individual trees and the mapping occurred to the half block level for short blocks and to the third of a block where blocks along San Pablo Avenue are longer. This means that where only few trees are scattered along the length of a half or third of a block without forming a perceptible row of trees, the length of that block was not identified as having a row of trees.

Figure 10-4 illustrates that rows of trees along sidewalks are present along long stretches of San Pablo Avenue. Notable exceptions are a longer stretch almost without rows of trees between Montoya Avenue and Barrett Avenue in Richmond and the only sporadic presence of rows of sidewalk street trees south of I-580 in Oakland. Also notable is the prominent presence of very mature, tall, and wide sidewalk and median trees between University and Ashby Avenues in Berkeley.



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Street Trees and Other Landscape Treatments in Sidewalks and Medians

- Row of Trees in Sidewalks or Medians
- Row of Trees Planted in Planter Strips
- Row of Street Trees in Median with Groundcover/Shrub Planting (No Trees)
- Median with Groundcover/ Shrub Planting (No Trees)
- Hardscape Median
- Vegetated Embankment
- Areas with Trees of Prominence (Mature Trees)

Lighting

- Cobrahead-Type Roadway Fixtures (only)
- Cobrahead-Type Roadway and Decorative Pedestrian-Scale Fixtures
- Decorative Roadway and Pedestrian-Scale Fixtures
- No Light Fixtures
- Activity Centers

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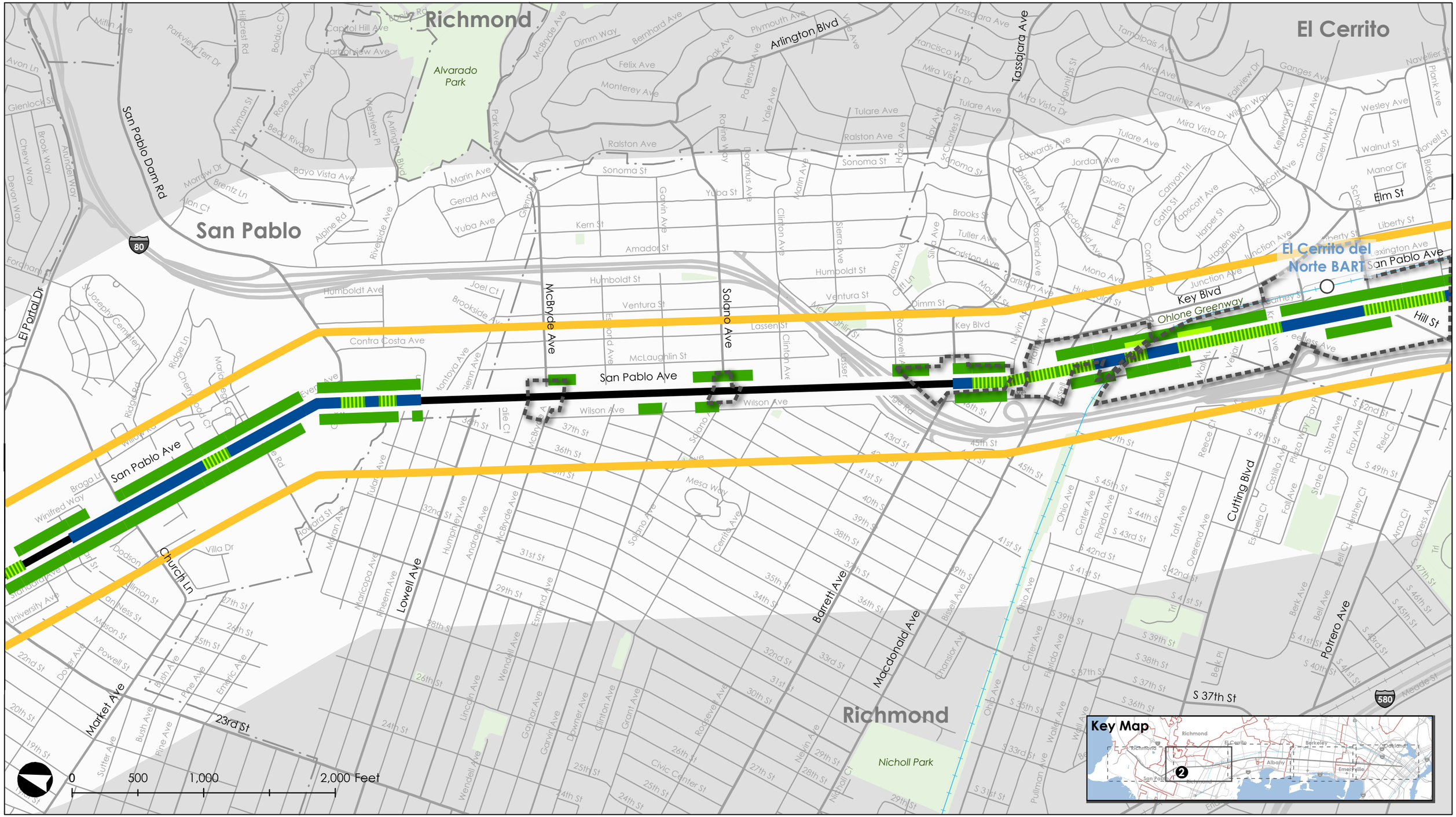
San Pablo Avenue Corridor Project

Figure 10-4.1 Streetscape Conditions

San Pablo Corridor between City of Richmond boundary and Church Lane

November 17, 2017(Optional)



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Street Trees and Other Landscape Treatments in Sidewalks and Medians

- Row of Trees in Sidewalks or Medians
- Row of Trees Planted in Planter Strips
- Row of Street Trees in Median with Groundcover/Shrub Planting (No Trees)
- Median with Groundcover/ Shrub Planting (No Trees)
- Hardscape Median
- Vegetated Embankment
- Areas with Trees of Prominence (Mature Trees)

Lighting

- Cobrahead-Type Roadway Fixtures (only)
- Cobrahead-Type Roadway and Decorative Pedestrian-Scale Fixtures
- Decorative Roadway and Pedestrian-Scale Fixtures
- No Light Fixtures
- Activity Centers

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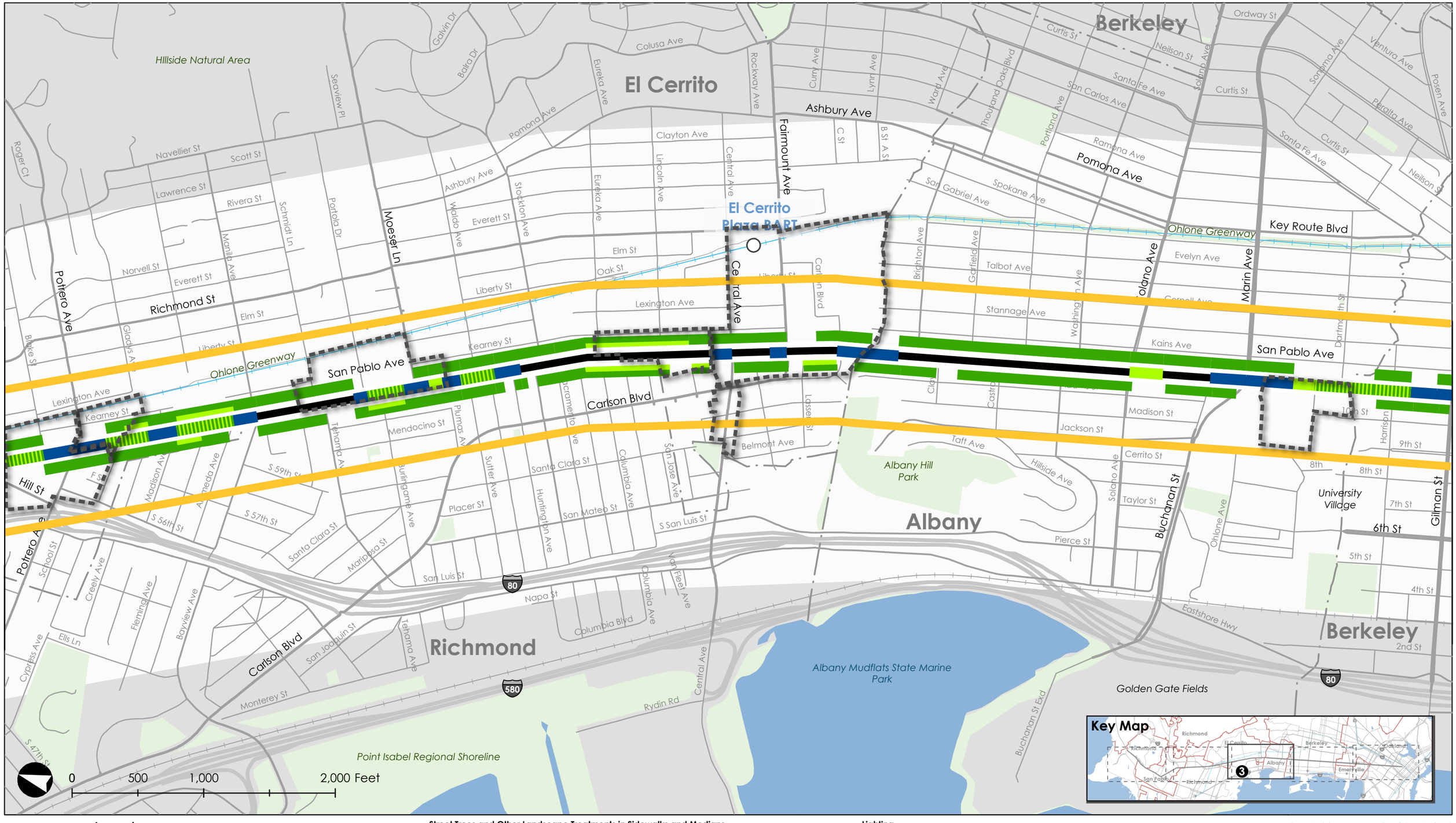
San Pablo Avenue Corridor Project

Figure 10-4.2 Streetscape Conditions

San Pablo Corridor between Church Lane and Potrero Avenue

November 17, 2017(Optional)



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Street Trees and Other Landscape Treatments in Sidewalks and Medians

- Row of Trees in Sidewalks or Medians
- Row of Trees Planted in Planter Strips
- Row of Street Trees in Median with Groundcover/Shrub Planting (No Trees)
- Median with Groundcover/ Shrub Planting (No Trees)
- Hardscape Median
- Vegetated Embankment
- Areas with Trees of Prominence (Mature Trees)

Lighting

- Cobrahead-Type Roadway Fixtures (only)
- Cobrahead-Type Roadway and Decorative Pedestrian-Scale Fixtures
- Decorative Roadway and Pedestrian-Scale Fixtures
- No Light Fixtures
- Activity Centers

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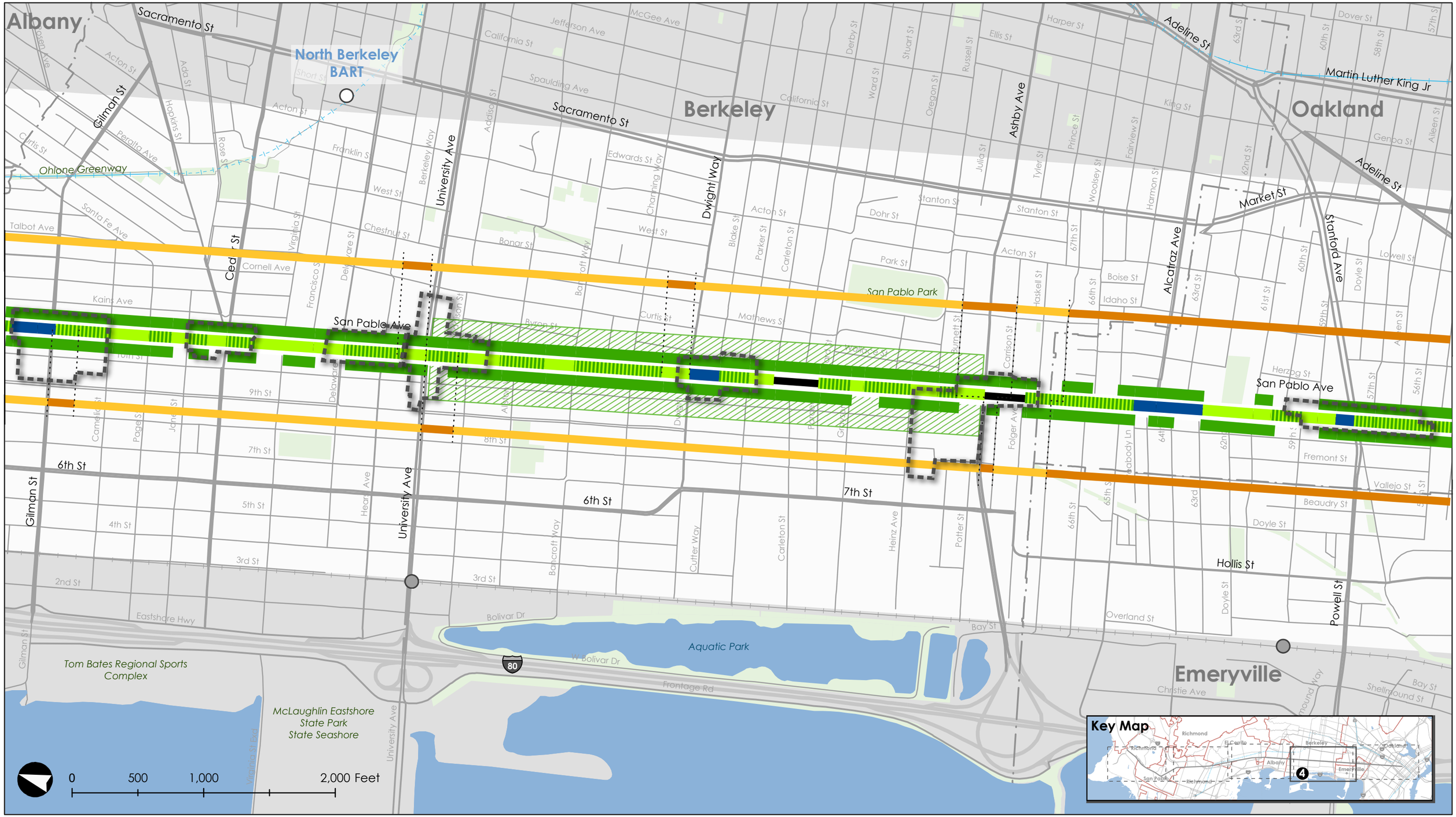
San Pablo Avenue Corridor Project

Figure 10-4.3 Streetscape Conditions

San Pablo Corridor between Potrero Avenue and Gilman Street

November 17, 2017(Optional)



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Street Trees and Other Landscape Treatments in Sidewalks and Medians

- Row of Trees in Sidewalks or Medians
- Row of Trees Planted in Planter Strips
- Row of Street Trees in Median with Groundcover/Shrub Planting (No Trees)
- Median with Groundcover/ Shrub Planting (No Trees)
- Hardscape Median
- Vegetated Embankment
- Areas with Trees of Prominence (Mature Trees)

Lighting

- Cobrahead-Type Roadway Fixtures (only)
- Cobrahead-Type Roadway and Decorative Pedestrian-Scale Fixtures
- Decorative Roadway and Pedestrian-Scale Fixtures
- No Light Fixtures
- Activity Centers

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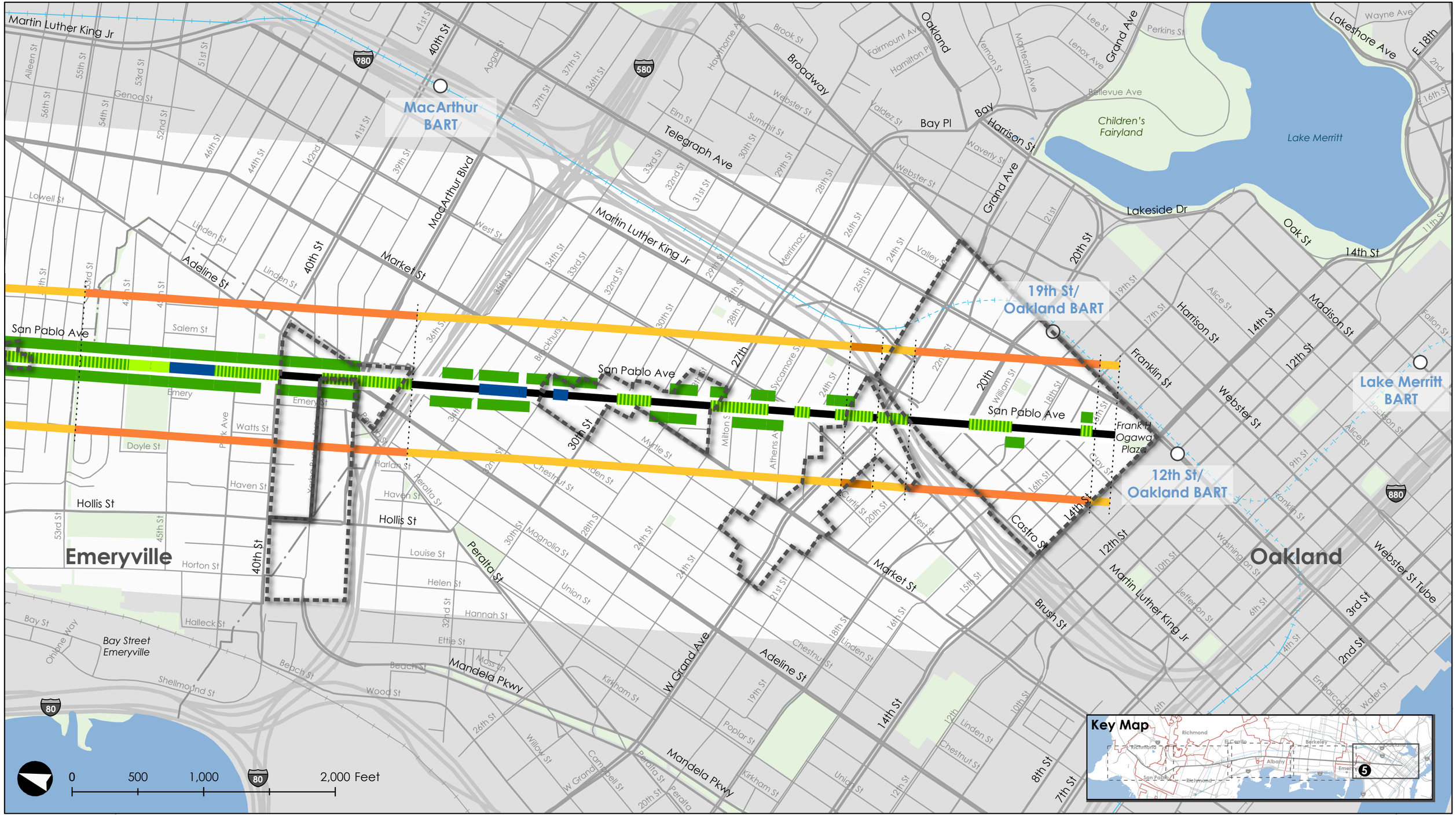
San Pablo Avenue Corridor Project

Figure 10-4.4 Streetscape Conditions

San Pablo Corridor between Gilman Street and City of Emeryville boundary

November 17, 2017(Optional)



Legend:

- BART Station
- BART Above/Below Ground
- Capitol Corridor Stations
- Freight Rail and Capitol Corridor Tracks
- Jurisdiction Boundary
- Freeways
- Water
- Parks/Open Space

Street Trees and Other Landscape Treatments in Sidewalks and Medians

- Row of Trees in Sidewalks or Medians
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- Row of Street Trees in Median with Groundcover/Shrub Planting (No Trees)
- Median with Groundcover/ Shrub Planting (No Trees)
- Hardscape Median
- Vegetated Embankment
- Areas with Trees of Prominence (Mature Trees)

Lighting

- Cobrahead-Type Roadway Fixtures (only)
- Cobrahead-Type Roadway and Decorative Pedestrian-Scale Fixtures
- Decorative Roadway and Pedestrian-Scale Fixtures
- No Light Fixtures
- Activity Centers

ALAMEDA County Transportation Commission

San Pablo Avenue Corridor Project

Figure 10-4.5 Streetscape Conditions

San Pablo Corridor between City of Emeryville Boundary and Frank Ogawa Plaza

November 17, 2017(Optional)

10.3.2.2 Landscape / Hardscape Treatments in Medians

Figure 10-4 provides an overview of where medians are present along San Pablo Avenue and distinguishes between medians that are landscaped with trees and/or understory landscaping (such as low shrubs, ground covers or grasses) or have received a decorative landscape treatment. Excluded from the mapping are narrow concrete medians of three feet where these are solely used to vertically delineate left turn pockets or otherwise channelize traffic.

10.3.2.3 Lighting

High quality street lighting increases the sense of safety for all users of a street. In addition, where pedestrian-scale light fixtures provide additional light along sidewalks, this promotes the nighttime use of sidewalks for café-type seating and walking, and specifically walking as a means of accessing transit.

Pedestrian-scale light fixtures, with light sources mounted between 12 to 18 feet, are specifically designed to illuminate sidewalk areas between the taller roadway light fixtures that primarily illuminate the roadway surface and intersections. Furthermore, the use of decorative fixtures, whether roadway and pedestrian-scale, can significantly contribute to a positive streetscape character, foster neighborhood identity, and raise the overall level of pedestrian comfort.

Figure 10-4 illustrates the different types of light fixtures that are currently used along the length of San Pablo Avenue and relative to the identified Activity Areas. Notable is the dominant use of utilitarian cobra head-type light fixtures and lack of use of pedestrian-scale fixtures. Decorative roadway and pedestrian-scale fixtures are only used throughout Emeryville and south of I-980 in Oakland. North of this area, Oakland uses pedestrian-scale fixtures in combination with cobra head-type roadway fixtures.

10.3.2.4 Key Findings

The Streetscape Conditions mapping identifies where streetscape conditions of a higher quality are already in place and, conversely, where such pedestrian-friendly conditions are lacking; this identification is particularly useful relative to areas identified as Pedestrian Priority Areas, areas of pedestrian emphasis, and in Activity Centers.

The mapping of median and sidewalk tree plantings also helps inform the development of Project Concepts by identifying locations where narrowing or eliminating medians or sidewalks may be challenging.

Also, identifying areas where the Pedestrian Emphasis and Activity Center mappings are not aligned with the location of street trees, pedestrian lighting, and other streetscape features can indicate where investment in streetscape improvements may be most needed to support a higher quality experience for existing and future pedestrians.

10.4 HOUSING AND EMPLOYMENT

This section summarizes the existing housing and employment totals within the Study Area and presents typical annual growth rates based on *Plan Bay Area 2013* data. In July 2013, ABAG and MTC jointly adopted the Plan Bay Area, which includes the Sustainable Communities Strategy (SCS). As part of the model update process, these SCS growth projections for the region were incorporated in the two travel models, Alameda CTC and Contra Costa Transportation Authority (CCTA), which encompass the Study Area by allocating land use and socio-economic data to the model traffic analysis zone (TAZ) systems. The horizon years for the updated models are 2010, 2020, and 2040.

10.4.1 EXISTING HOUSING AND EMPLOYMENT

2010 housing and employment totals were obtained for Alameda County from each of the 105 TAZs in the Study Area from the Alameda CTC model, while 2010 housing and employment totals were obtained for Contra Costa County from each of the 129 TAZs in the Study Area from the CCTA model. The zonal land use data was then aggregated to the city jurisdiction in which each TAZ was located. **Table 10-1** provides a summary of total households, total employment, and retail employment within the Study Area for each city jurisdiction. Retail employment is included due to its influence on goods movement through the corridor.

As shown in Table 10-1, the Study Area includes approximately 74,000 households and 145,000 jobs among seven cities along the San Pablo Avenue corridor.

TABLE 10-1: STUDY AREA HOUSING AND EMPLOYMENT BY CITY

City	Households	Employment	Retail Employment
Albany	7,411	4,171	550
Berkeley	13,747	23,131	2,806
El Cerrito	6,819	4,153	1,785
Emeryville	2,873	9,401	900
Oakland	21,680	89,479	3,852
Richmond	13,629	9,560	2,789
San Pablo	7,599	4,650	1,521
Total	**73,758**	**144,545**	**14,203**

10.4.2 HOUSING AND EMPLOYMENT GROWTH RATES

Housing and employment totals were also used to determine typical annual growth rates from 2010 to 2040 based on *Plan Bay Area 2013* data. **Table 10-2** provides a summary of total household, total employment, and retail employment annual growth rates within the Study Area for each city jurisdiction.

TABLE 10-2: STUDY AREA HOUSING AND EMPLOYMENT ANNUAL GROWTH RATES BY CITY

City	Households	Employment	Retail Employment
Albany	0.6%	1.1%	1.0%
Berkeley	0.7%	1.1%	1.0%
El Cerrito	0.7%	1.0%	0.3%
Emeryville	3.7%	1.4%	1.8%
Oakland	2.8%	1.2%	1.4%
Richmond	1.0%	1.2%	0.7%
San Pablo	1.0%	1.6%	0.8%
Total	**1.5%**	**1.2%**	**1.0%**

As shown in Table 10-2, total households are estimated to grow by approximately 1.5 percent per year between 2010 and 2040 while total employment is estimated to grow by approximately 1.0 percent per year between 2010 and 2040.

10.5 DEMOGRAPHICS

This section presents a summary of demographics within the Study Area, including a discussion on Communities of Concern. Household auto ownership and average household income were obtained from the Alameda CTC and CCTA travel models while Communities of Concern boundaries were obtained from MTC.

10.5.1 EXISTING HOUSHOLD DEMOGRAPHICS

2010 household auto ownership and average household income were obtained for Alameda County from each of the 105 TAZs in the Study Area from the Alameda CTC model, while 2010 household auto ownership and average household income were obtained for Contra Costa County from each of the 129 TAZs in the Study Area from the CCTA model. The zonal land use data was then aggregated to the city jurisdiction in which each TAZ was located. **Table 10-3** provides a summary of household auto

ownership and average household income within the Study Area for each city jurisdiction.

TABLE 10-3: STUDY AREA HOUSEHOLD AUTO OWNERSHIP AND AVERAGE HOUSEHOLD INCOME BY CITY

City	Zero Auto Households	Single Auto Households	Two or More Auto Households	Average Household Income
Albany	1,050	3,123	3,239	$44,707
Berkeley	2,434	6,833	4,480	$35,710
El Cerrito	766	2,878	3,175	$45,834
Emeryville	492	1,470	911	$40,336
Oakland	7,574	10,662	3,444	$23,862
Richmond	1,509	6,006	6,113	$36,952
San Pablo	1,419	3,353	2,827	$33,380
Total	**15,243**	**34,325**	**24,190**	**$34,237**

As shown in Table 10-3, roughly 15,000 or 21 percent of households within the Study Area own zero autos, roughly 34,000 or 47 percent own a single auto, and roughly 24,000 or 33 percent own two or more autos. Additionally, the average household income ranges from roughly $24,000 within Oakland to roughly $46,000 within El Cerrito, while the average Study Area household income is roughly $34,000.

10.5.2 COMMUNITIES OF CONCERN

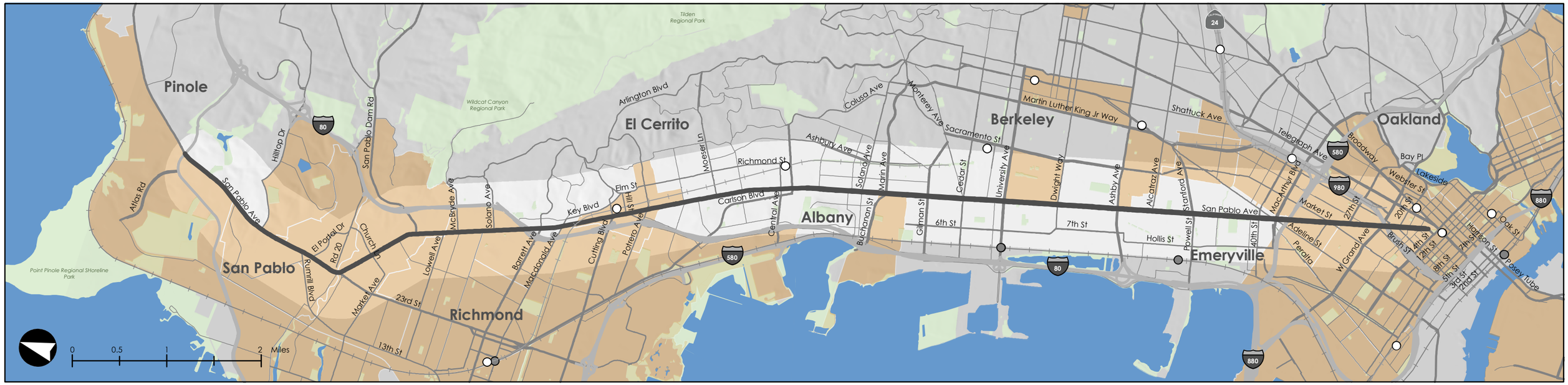
MTC revised its definition of a Community of Concern as part of the update to the latest Regional Transportation Plan, also known as Plan Bay Area. MTC's revised definition identifies eight disadvantage factors each with their own community concentration threshold as shown in **Table 10-4**. MTC defines a community of concern as an area with its percent of population outside four or more of the disadvantage factor community concentration thresholds or as an area with its percent of population outside both the low-income and minority community concentration factors.

TABLE 10-4: DISADVANTAGE FACTORS USED BY MTC TO IDENTIFY COMMUNITIES OF CONCERN		
Disadvantage Factor	Percent of Regional Population	Community Concentration Threshold
1. Minority Residents	54%	70%
2. Low-Income Residents (<200% of poverty)	23%	30%
3. Residents who do not speak English well or at all	9%	20%
4. Households with no car	9%	10%
5. Seniors age 75+	6%	10%
6. Persons with a disability	18%	25%
7. Single-parent households	10%	15%
8. Cost-burdened renters	10%	15%

Source: American Community Survey 2005-09 tract-level data except for population with a disability, which is from Census 2000.

Communities of Concern boundaries, shown on **Figure 10-5**, were obtained from MTC. The light brown shaded areas represent Communities of Concern within the study area. It was determined that 133 or 57 percent of Study Area TAZs were located within a Community of Concern primarily concentrated at the southern and northern ends of the corridor. **Table 10-5** provides a summary of total and percentage of total households, total employment, and retail employment within a Community of Concern within the Study Area for each city jurisdiction.

As shown in Table 10-5, roughly 42,000 or 56 percent of Study Area households are within a Community of Concern while roughly 101,000 or 70 percent of employment is within a Community of Concern.



Legend:

- BART Station
- BART Lines Above Ground
- Capitol Corridor Stations
- Capitol Corridor Line
- Freeways
- MTC Communities of Concern
- Water
- Parks/Open Space

San Pablo Avenue Corridor Project

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Figure 10-5 MTC Communities of Concern

November 17, 2017

TABLE 10-5: STUDY AREA HOUSING AND EMPLOYMENT WITHIN A COMMUNITY OF CONCERN BY CITY						
City	Households		Employment		Retail Employment	
Albany	1,095	15%	512	12%	26	5%
Berkeley	3,242	24%	1,249	5%	142	5%
El Cerrito	1,325	19%	1,352	33%	629	35%
Emeryville	0	0%	0	0%	0	0%
Oakland	18,903	87%	88,134	98%	3,781	98%
Richmond	9,459	69%	4,950	52%	979	35%
San Pablo	7,599	100%	4,650	100%	1,521	100%
Total	**41,623**	**56%**	**100,847**	**70%**	**7,078**	**50%**

10.6 ECONOMIC DEVELOPMENT

San Pablo Avenue has numerous existing business and mixed-use districts and is the focus of many communities' economic development efforts. This section describes the existing retail nodes and recent and planned real estate development activity in Study Area. In addition, this section also describes nodes of interest that have been identified by local jurisdictions for future development and/or public investments. The section draws on data from a variety of sources, including interviews conducted with the Economic Development and Planning staff members of local jurisdictions.[11]

10.6.1 EXISTING RETAIL NODES

Figure 10-6 shows the density of existing retail space[12] within Study Area. Most of San Pablo Avenue is lined with retail, with more concentrated nodes at major intersections. Generally, San Pablo Avenue is characterized by segments of strip retail on relatively shallow parcels, with some larger, neighborhood-serving shopping centers and big box stores at major intersections. There are also regional shopping centers in Study Area, such as the Shops at Hilltop (Hilltop Mall) in Richmond, El Cerrito Plaza in El Cerrito, and East Baybridge Shopping Center in Emeryville. Other notable concentrations of retail activity (shown in red on Figure 10-6) include the College Center and Town Center shopping centers in San Pablo; the intersection of Solano Avenue and San Pablo Avenue in Albany; the intersections of San Pablo Avenue with Gilman Street and University

[11] Interviews were completed with staff from the Cities of Albany, Berkeley, El Cerrito, Emeryville, Oakland, Richmond, and San Pablo, as well as with BART staff.

[12] Includes all rentable building area as provided by CoStar, a private data vendor; includes space occupied by traditional retailers, restaurants, and personal services (e.g., fitness centers, salons, etc.), as well as vacant space.

Avenue in Berkeley; and Downtown Oakland. While a few of these existing retail nodes (Solano Avenue, University Avenue, and Downtown Oakland) are relatively walkable, most are auto-oriented.

As discussed in more detail below, some of the commercial parcels have recently been redeveloped, or are the subject of new development proposals. In general, most development proposals are replacing low-intensity strip retail with higher-intensity residential or mixed-use development. This is consistent with most of the cities' land use and economic development plans, which generally envision a significant increase in residential development, with commercial uses concentrated at major intersections and other key nodes.

10.6.2 RECENT AND PLANNED DEVELOPMENT

Figure 10-7 shows recently completed, planned, and proposed real estate development projects in the Study Area, by land use type.[13] Most of the recent and planned development is residential or mixed-use. In many places on Study Area, new development has been located within existing retail nodes. As shown in **Table 10-6**, most of the residential development[14] in the Study Area is located in El Cerrito, Berkeley, Emeryville, and Oakland. Within Oakland, almost all of the development is in Downtown.

TABLE 10-6: ESTIMATED RESIDENTIAL UNITS IN THE DEVELOPMENT PIPELINE IN THE STUDY AREA

City	Units
San Pablo	0
Richmond	172
El Cerrito	1,470
Albany	175
Berkeley	1,170
Emeryville	882
Oakland	4,281

Notes:

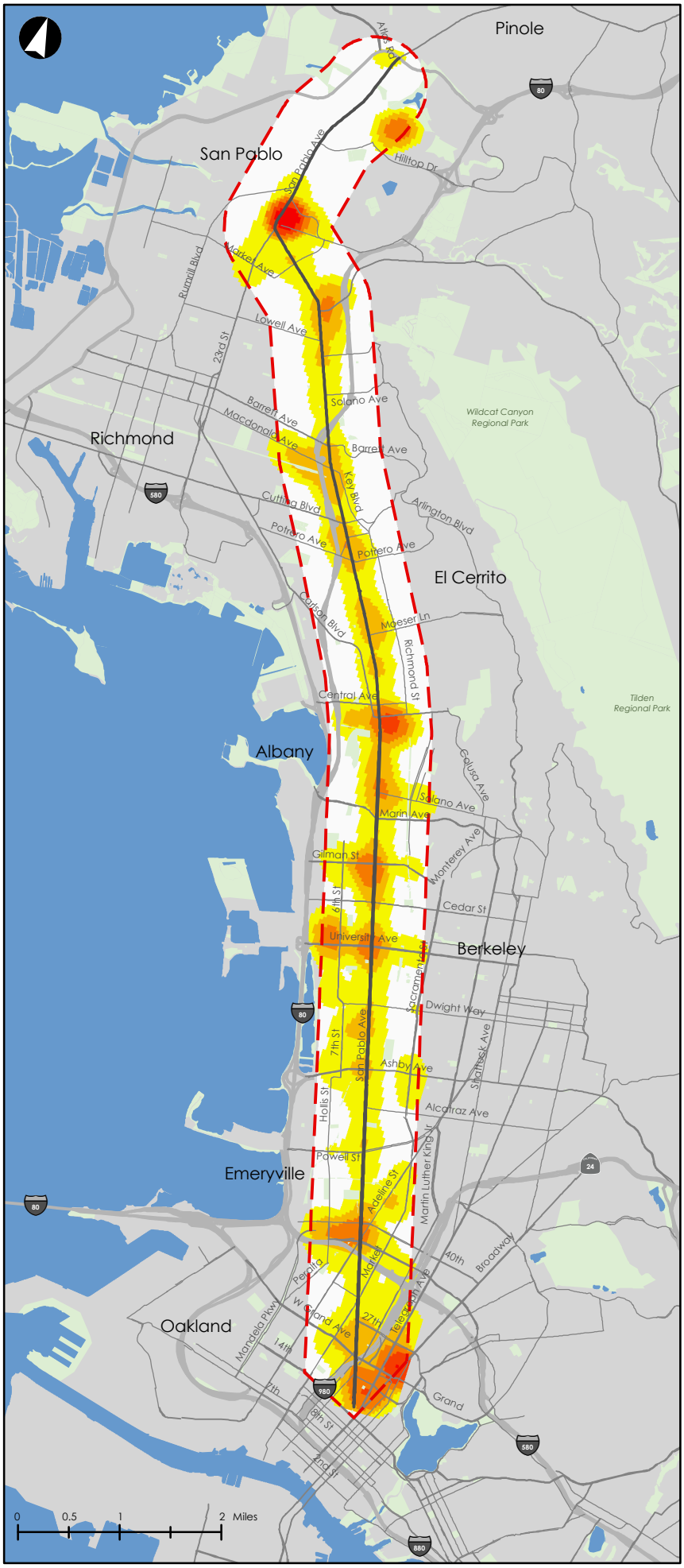
2. Includes recent, planned, proposed, and under construction units as tracked by each jurisdiction. Development projects shown were collected from the most recent publicly available data. Given the variety sources, information may not be comprehensive.

Sources: City of San Pablo, 2017; City of Richmond, 2017; City of Albany, 2017; City of Berkeley, 2017; City of Emeryville, 2017; City of Oakland, 2017; Strategic Economics, 2017.

[13] As reported by cities along the corridor.

[14] Only residential units are shown because the jurisdictions do not track commercial square footage (particularly ground floor retail) consistently.

Figure 10-6 Concentrations of Retail on San Pablo Avenue



Legend:

Retail Density (Average Retail Sq. Ft., Per Quarter Mile)

- 124,450 - 522,690
- 522,691 - 1,169,830
- 1,169,831 - 2,314,771
- 2,314,772 - 4,131,742
- 4,131,743 - 6,346,953

Sources and Notes:

Excludes retail concentrations of less than 100,000 square feet per quarter mile.

CoStar, October 2017; Strategic Economics, 2017; CD+A, 2017.

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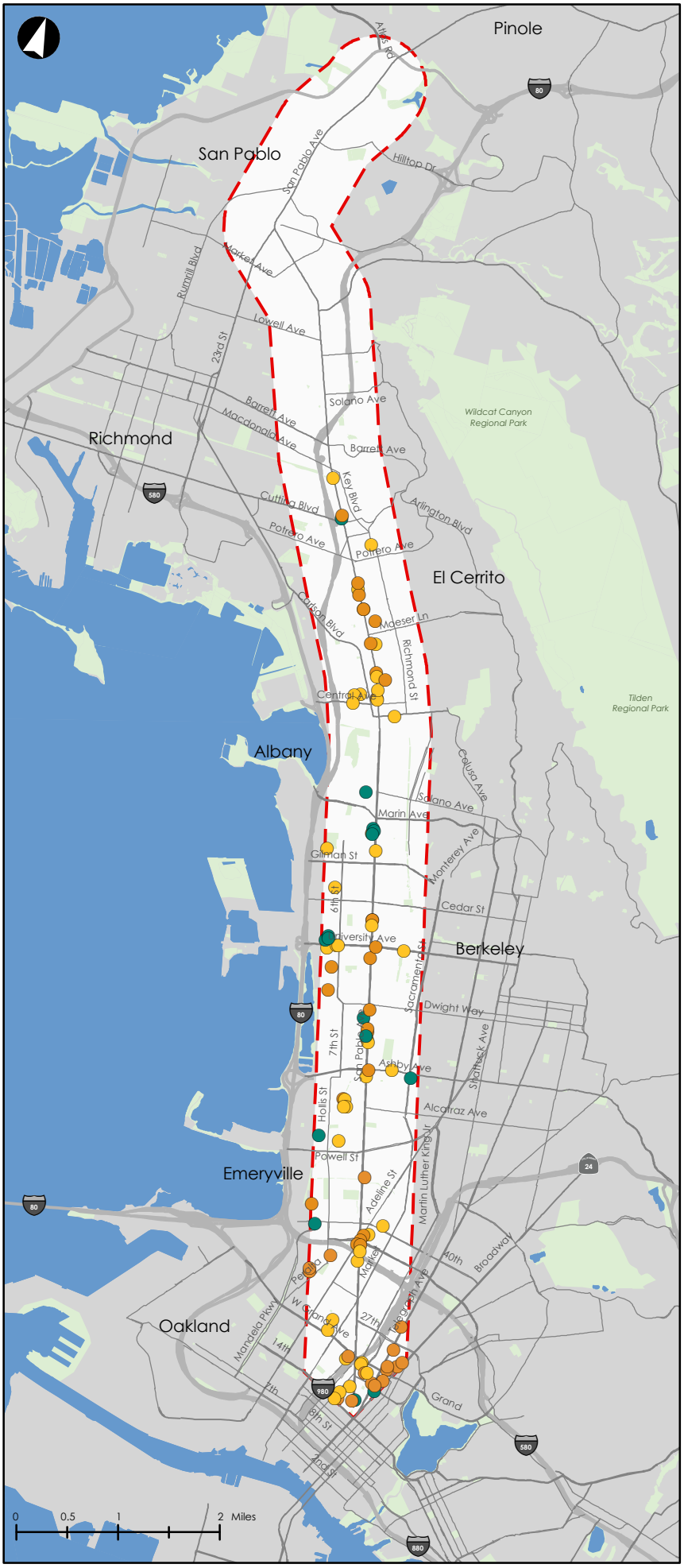
Figure 10-7 Recent, Planned, and Proposed Development on San Pablo Avenue



Legend:

Recent, Planned, and Proposed Development Projects, by Type

- Commercial and Industrial
- Mixed-Use Residential
- Residential

Sources and Notes:

City of San Pablo, 2017; City of Richmond, 2017; City of El Cerrito, 2017; City of Berkeley, 2017; City of Oakland, 2017; CoStar, October 2017; Strategic Economics, 2017; CD+A, 2017.

Note: Development projects shown were collected from the most recent publicly available data. Given the variety of public sources and information provided, development projects may not be comprehensive.

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10.6.3 CITY-IDENTIFIED NODES OF INTEREST

Figure 10-8 shows nodes of interest identified in discussion with City staff. The following sections describe the nodes identified in each city, roughly from north to south.

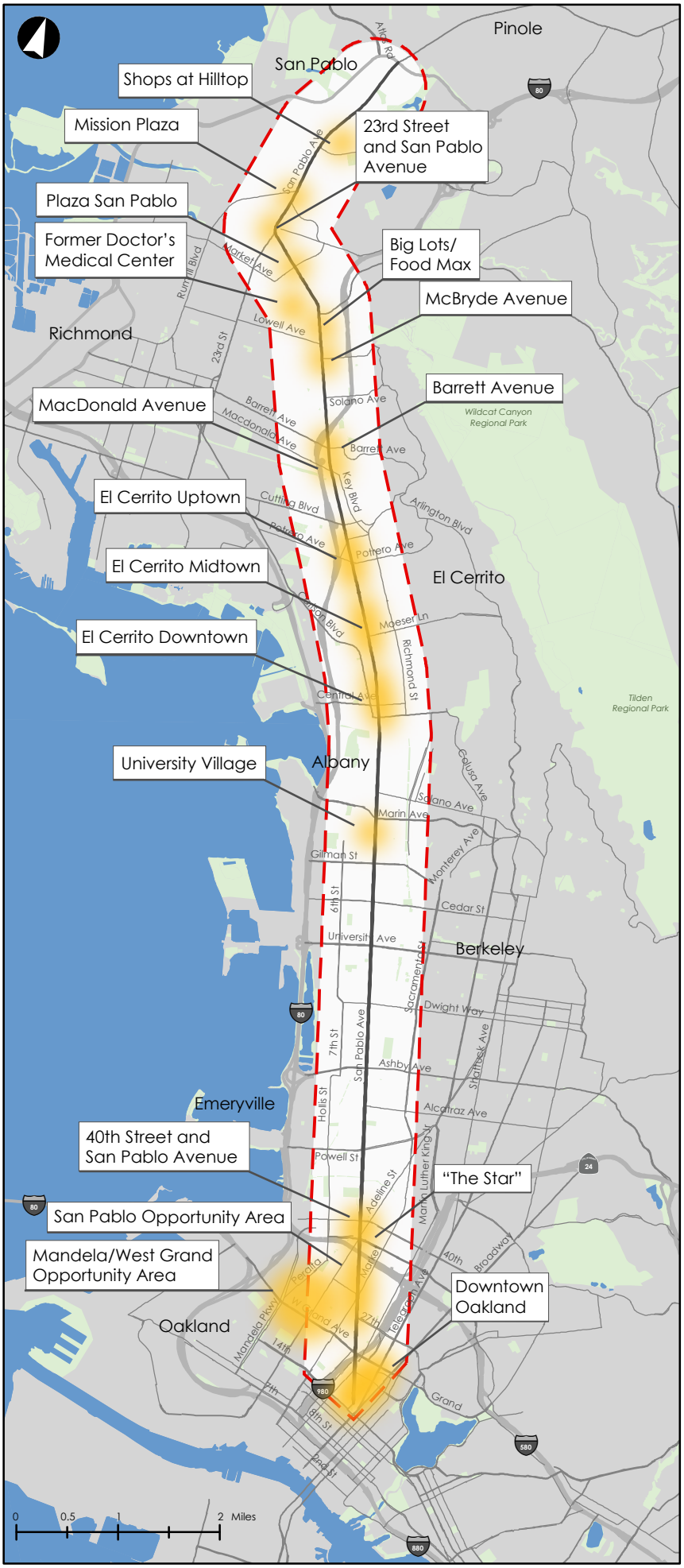
10.6.3.1 Richmond

Richmond's adopted General Plan in 2012 envisions intensification and mixed-use development on its key commercial transit corridors, including San Pablo Avenue. More recently, the City adopted a Form-Based Code to implement the mixed-use vision in the General Plan. These planning documents identify the following nodes for future mixed-use, higher-density development:

- **MacDonald Avenue:** The parcels at the intersection of San Pablo Avenue and MacDonald Avenue are designated as a T5 Main Street Transect Zone in the Form-Based Code. This corner is envisioned as a vibrant, walkable urban main street with locally and regionally serving commercial, retail, entertainment, and civic uses, in addition to higher density urban housing choices. The parcels immediately adjacent to the T5 Main Street Zone are designated as T5 Neighborhood areas, which provide medium to high density housing, scaling down to the surrounding lower density neighborhoods. While this area has not recently received new development, vacant and under-utilized retail spaces have been re-tenanted.
- **Barrett Avenue:** The parcels on the corner of San Pablo Avenue and Barrett Avenue are designated as T5 Main Street in the Form-Based Code, the same designation as the MacDonald Avenue intersection.
- **McBryde Avenue:** The intersection of San Pablo Avenue and McBryde Avenue is designated as a T4 Main Street zone in the Form-Based Code. This corner is envisioned as a vibrant main street environment that serves the day-to-day needs of surrounding single-family neighborhoods.
- **Hilltop:** The Hilltop area, which includes the Hilltop Mall outside of the Study Area as well as surrounding residential and commercial areas within the Study Area, has been identified as an area of change in the General Plan. The Mall and the area between Hilltop Mall Road and Hilltop Drive are designated as a Major Activity Center to enable its transformation from a suburban auto-oriented retail center to a walkable urban center, with a mix of regional retail, entertainment, office, and residential uses. The areas to the west and north of the mall, which are located within the Study Area, are envisioned for higher-density residential development to complement the commercial uses. The 1.1 million-square-foot mall, which has high vacancies, went into foreclosure and was acquired in July 2017 by a new owner, who is moving forward with redevelopment plans for the area.

San Pablo Avenue Corridor Project

Figure 10-8 City-Identified Nodes of Interest on San Pablo Avenue



Legend:

City-Identified Nodes of Interest

Sources and Notes:

Interviews with City Staff, October, 2017; Strategic Economics, 2017; CD+A, 2017.

**Information for Berkeley and Richmond to be added pending interviews with City staff.

ALAMEDA County Transportation Commission

10.6.3.1.1 Leveraging Development for Transportation Infrastructure

Richmond has traffic impact fees in place for new development. The City anticipates that redevelopment of the Hilltop area will provide an opportunity to make major streetscape improvements to create a more walkable environment. The City intends to apply for new grants to fund a streetscape plan for San Pablo Avenue, pending the results of ongoing studies. The City has also explored forming a shared business improvement district with the cities of El Cerrito and San Pablo. The multi-jurisdictional BID would provide new revenues from businesses and/or property owners to help fund transportation and infrastructure improvements.

10.6.3.2 San Pablo

San Pablo Avenue is the main commercial corridor in the City of San Pablo, and as a result many of the City's economic development efforts are focused on San Pablo Avenue. In particular, the City has identified the following nodes as major opportunity sites in recent studies and plans including a recent *Targeted Industries Study*:

- **Mission Plaza** (intersection of San Pablo Avenue, Broadway Avenue, and Rumrill Boulevard): The Targeted Industries Study envisions a transit-oriented mixed-use development project, with up to 50,000 square feet of ground floor commercial and 100,000 square feet of residential. The project could potentially take the form of a partnership with nearby Contra Costa College and/or the Contra Costa County Housing Authority. The location hosts a major bus transfer center and is considered a potential future BART station. To support future development, the City is considering a street realignment to make the intersection more walkable.
- **23rd Street and San Pablo Avenue:** The Targeted Industries Study envisions significant mixed-use development at this node (up to 90,000 square feet of ground floor commercial, and 180,000 square feet of residential), supported by a reconfiguration of the intersection to create a traffic circle with a one-acre park or public plaza.
- **Plaza San Pablo (Church Lane and San Pablo Avenue):** This 165,000 square foot site (also known as Circle S) is envisioned as San Pablo's future downtown. A new Walgreens, San Pablo Library, and West County Health Center recently opened, and the City recently celebrated the groundbreaking of a County Women, Infants, and Children (WIC) building. The City is also in the process of relocating the City's administrative offices to the site (creating another potential opportunity site where the existing administrative offices are located). In addition, the site could identify up to 32,000 square feet of ground floor commercial and 64,000 square feet of residential development.
- **Big Lots/Food Max:** The Targeted Industries Study envisions the transformation of the existing big box site into a walkable mixed-use development, including up to 52,900 square feet of ground floor commercial, 94,400 square feet of residential, and additional flex (office or residential) space.

The project would be supported by public infrastructure projects including daylighting Wildcat creek.

- **Former Doctor's Medical Center Site (2000 Vale Road):** This site, formerly owned by the West Contra Costa County Healthcare District, was recently sold and rezoned for Commercial Mixed Use. This site may be developed as a hotel or use that is supportive of the adjacent to San Pablo Lytton Casino.

10.6.3.2.1Leveraging Development for Transportation Infrastructure

As discussed above, the City of San Pablo is planning significant public infrastructure improvements to help incentivize new development in the corridor. In general, new development will be expected to contribute to a pedestrian-friendly environment (for example, with buildings that front on the street, parking in the rear, etc.). However, the real estate market is relatively weak in this segment of the corridor, so new development is unlikely to contribute to significant public improvements. The City does not have a development impact fee for local roads, but does collect the West County Subregional Transportation Mitigation Program (STMP) fee, intended to mitigate regional traffic impacts of new development.

10.6.3.3 El Cerrito

El Cerrito's *San Pablo Avenue Specific Plan*, adopted in 2014, articulates a vision for higher density, mixed-use and multi-family development, with a "complete streets" focus to ensure San Pablo Avenue serves as a multimodal corridor that is welcoming to transit, bicycles, and pedestrians. The Specific Plan breaks the corridor into three main districts:

- **Uptown:** Located within a ½-mile of the El Cerrito Del Norte BART station, this is envisioned as a higher activity commercial and entertainment node with allowable building heights up to 65 feet.
- **Midtown:** Midtown is identified as a civic and community-oriented zone geared towards multi-family residential development and ground-floor retail, with slightly lower allowable building heights (55 feet).
- **Downtown:** Similar to Uptown, Downtown is located within a ½-mile of the El Cerrito Plaza BART station and is envisioned as a higher-intensity commercial and entertainment node with building heights up to 65 feet.

In part due to the *San Pablo Avenue Specific Plan*, the City is attracting significant new interest in residential and mixed-use development in the PDA. In addition to development that is currently in the pipeline, BART owns potential development sites at both the El Cerrito Plaza and El Cerrito Del Norte BART stations. The City has a memorandum of understanding (MOU) with BART to consider development at El Cerrito Plaza in the near-term, potentially to include a public library and associated parking. Implementation challenges at El Cerrito Del Norte may make this station a longer-term opportunity.

10.6.3.3.1 Leveraging Development for Transportation Infrastructure

El Cerrito is in the process of developing a Transportation Impact Fee. This fee has been captured for recently entitled projects through a Condition of Approval that states "Applicant shall pay a fair share of the San Pablo Avenue Specific Plan Complete Streets Improvements as determined by the Public Works Director." The City hopes to leverage the fee with grant funds to complete the San Pablo Avenue Complete Streets fund. The City also collects the West County Subregional Transportation Mitigation Program (STMP) fee.

10.6.3.4 Albany

The new **University Village** project, including a Sprouts Farmer's Market, senior apartment complex, and retail shops was recently completed along San Pablo Avenue at Monroe Street. The City has not identified any other major economic development nodes on San Pablo Avenue. However, the City's Economic Development Strategic Plan (adopted in September 2017) recommends that the City consider undertaking a San Pablo Avenue Area Plan with an Environmental Impact Report (EIR), in an effort to smooth the way for new infill development in the future.

10.6.3.4.1 Leveraging Development for Transportation Infrastructure

New development in Albany may be expected to contribute to nearby transportation improvements as a condition of approval. For example, the University Village project includes new crosswalks, medians, signals, and cycle tracks. The City also has a Capital Facilities Impact Fee in place to mitigate the impacts of new development.

10.6.3.5 Berkeley

The City of Berkeley does not have a specific plan or economic development strategy for San Pablo Avenue, and has not identified specific nodes to concentrate future economic development efforts. The City has identified significant housing development opportunities on San Pablo Avenue; the 2015-2023 Housing Element calculated that San Pablo Avenue could accommodate 1,047 units, or about 20 percent of the citywide total. However, the vast majority of the opportunity sites on Study Area are parcels where there is currently a business in operation, and some owners have not been interested in selling.

In December 2016, Berkeley conducted an economic development study and City Council work session focused on identifying existing conditions San Pablo Avenue (including existing retail concentrations at Gilman Street, Cedar Street, University Avenue, Dwight Street, and Ashby Street). The study noted that City staff were considering pursuing grant funding for a comprehensive land use planning effort, which would help Berkeley develop a long-term vision for the corridor. The study also noted several merchants' associations that includes businesses located within Study Area. These include the West Berkeley Design Loop, a business association consisting of home

improvement and décor stores that includes some businesses on San Pablo Avenue; the University Avenue Association; and the Gilman Corridor Merchants Association.

10.6.3.5.1Leveraging Development for Transportation Infrastructure

The City of Berkeley does not have a transportation impact fee in place. Development mitigations are considered on a project-by-project basis. Depending on the project, these could include improvements such as landscaping or sidewalk bulb-outs.

10.6.3.6 Emeryville

Emeryville's General Plan identifies opportunities for higher density infill development along San Pablo Avenue, and the corridor has already attracted significant mixed-use development. City staff identified two particular areas of focus:

- **The "Star" Intersection** (intersection of San Pablo Avenue with Adeline Street and West MacArthur Boulevard): Of the six corners in this intersection, almost all have recently completed development or development projects (residential and mixed-use) that are either under construction or proposed.
- **40th Street and San Pablo Avenue:** This intersection already has significant mixed-use development, and is envisioned for additional development. Implementation challenges make the timing of future development uncertain.

In addition to the ongoing residential and mixed-use development on Emeryville's segment the corridor, the City also anticipates that one or more regional-scale cannabis dispensaries will locate within Study Area.

10.6.3.6.1Leveraging Development for Transportation Infrastructure

The City of Emeryville has a transportation impact fee in place, and typically requires that market-rate development provide additional local mitigations as conditions of approval (e.g., extending sidewalks, undergrounding utilities, bicycle improvements).

10.6.3.7 Oakland

The Study Area overlaps with several specific plan areas in Oakland, including the West Oakland Specific Plan (WOSP), the Broadway Valdez District Specific Plan (BVDSP), and the (ongoing) Downtown Oakland Specific Plan (DTSP). The following nodes of interest were identified in these plans and/or in interviews with City Economic Development staff:

- **San Pablo Avenue Opportunity Area:** The WOSP defines this area as the portion of San Pablo Avenue corridor from approximately I-580 to West Grand Avenue, and along West Grand to Market Street. The corridor currently includes numerous vacant and underutilized lots and empty storefronts, and runs through some of the most disadvantaged neighborhoods in the Oakland. The WOSP envisions a transformed major commercial corridor lined with active ground-floor commercial uses, mixed-use residential development, and enhanced streetscapes. The renovation of the California Hotel (completed in 2014) with 137

apartments is intended to serve as an anchor for revitalizing this area. People's Grocery, a healthy food access organization in Oakland, also plans to locate in this area.

- **Mandela Parkway and West Grand Avenue Opportunity Area:** The Study Area overlaps with the northern and eastern portions of Mandela Parkway and West Grand Avenue Opportunity Area, as identified in the WOSP. The WOSP identifies this area as having the potential to development into a major business and employment center for West Oakland. Land use recommendations for this opportunity area encourage a mix of business activities that will generate a range of jobs at varying skill and educational levels. The WOSP calls for up to 4.3 million square feet of commercial space and 110 residential units in this area. Several mixed-use residential projects are currently in the development pipeline.
- **Downtown Oakland:** The Study Area captures the northwestern edge of Downtown Oakland (roughly the Uptown district). While the DTSP is currently in process, Downtown – and Uptown in particular – is already attracting significant new office and residential/mixed-use development.

10.6.3.7.1 Leveraging Development for Transportation Infrastructure

Transportation and capital facilities impact fees on new residential and non-residential projects in Oakland went into effect in September 2016. Fee revenues will be spent to mitigate the cumulative impacts of new development, as documented in the City's Transportation and Capital Improvements Impact Fee Nexus Analysis. Development projects in Oakland may also be required to provide local improvements to mitigate impacts in the immediate vicinity of the development, through conditions of approval.

10.6.4 KEY FINDINGS

A summary of key findings related to economic development along the San Pablo Avenue Corridor is presented below:

- San Pablo Avenue is a vital commercial corridor for all of the jurisdictions in Study Area, with either significant existing or planned retail space throughout.
- Businesses on San Pablo Avenue tend to rely heavily on parking availability, because of the auto-oriented nature of the street and in some cases because of the nature of the businesses (for example, home improvement stores or big box stores where customers may prefer to drive to make large purchases).

- In general, the economic development and planning documents for the cities along San Pablo Avenue envision complete streets improvements as part of a more vibrant, pedestrian-oriented shopping environment. This is consistent with research that shows that complete or "sustainable" streets improvements – such as reduced speed limits, narrowed lanes, wider sidewalks, more frequent pedestrian crossings, and new bike lanes – can result in increased retail sales.[15] Complete streets improvements will also support the ongoing transition of the corridor to accommodate more residential uses.
- Given San Pablo Avenue's important role as an economic generator, it will be vital to carefully manage any future construction of multimodal transportation improvements to mitigate potential impacts on businesses.
- Significant new, residential and mixed-use development is underway in many parts of Study Area, with additional nodes planned. Most development projects are replacing low-intensity strip retail with higher-intensity residential or mixed-use development. This is consistent with most of the cities' land use and economic development plans, which generally envision a significant increase in residential development, with commercial uses concentrated at major intersections and other key nodes.
- The majority of recently completed, planned, and proposed development in the Corridor are located in the Cities of El Cerrito, Berkeley, and Emeryville, as well as in Downtown Oakland. This reflects the stronger real estate market conditions in these communities, as well as local land use policies.
- Most of the jurisdictions interviewed expect new development to orient to the street and incorporate other pedestrian-friendly design elements.
- In some jurisdictions (particularly those with stronger real estate markets), new development is also expected to contribute to transportation and other public infrastructure improvements in order to mitigate development impacts, through a combination of impact fee payments and/or direct improvements as a condition of approval.
- New residential development on San Pablo Avenue may generate additional demand for parking and transportation.

[15] G. Hack, "Business Performance in Walkable Shopping Areas" (Princeton, NJ: Active Living Research, a National Program of the Robert Wood Johnson Foundation, 2013), http://activelivingresearch.org/business-performance-walkable-shopping-areas; City of New York Department of Transportation, "Economic Benefits of Sustainable Streets," 2014, http://www.nyc.gov/html/dot/downloads/pdf/dot-economic-benefits-of-sustainable-streets.pdf; Mariela Alfonzo and Christopher B. Leinberger, "Walk This Way: The Economic Promise of Walkable Places in Metropolitan Washington, D.C." (Brookings Institution, 2012), https://www.brookings.edu/research/walk-this-waythe-economic-promise-of-walkable-places-in-metropolitan-washington-d-c/; Emily Drennen, "Economic Effects of Traffic Calming on Urban Small Businesses" (San Francisco State University, 2003), https://www.sfbike.org/download/bikeplan/bikelanes.pdf.