

Section 2

Project Description

2.1 INTRODUCTION

This section describes the Proposed Project evaluated in this Draft Environmental Impact Report (Draft EIR). The Proposed Project was conceived as a way to bring commute alternatives to a rapidly developing and increasingly congested region of the BART District. BART is seeking a way to implement a rail extension at an achievable cost in a reasonable time period, and an extension where the public investment in the rail system is balanced by the ridership generated. The proposed eBART project, BART's first venture with a technology other than that of conventional BART, is intended to provide an excellent connection to the full 100-mile BART system. The Proposed Project could be put into service without waiting for significant new funding resources, and it would meet the criteria of the System Expansion Policy. See Section 1.1, Project Overview, for more information. Features of the project presented in this section include:

- *Proposed Technology* – A self-propelled passenger vehicle that uses one or more diesel engines for propulsion power and operates on standard railroad tracks;
- *Route, or Alignment* – The route would operate in the median of State Route 4 (SR 4), which is in the process of being widened by Caltrans and the Contra Costa Transportation Authority (CCTA);
- *Stations* – Two stations are planned where passengers can board or exit the system, at Railroad Avenue in the City of Pittsburg and east of Hillcrest Avenue in the City of Antioch, and a transfer platform is planned where passengers of the Proposed Project can connect to the BART system;
- *Projected Ridership* – The number of passenger boardings and exitings are projected, along with the number of passengers transferring to the BART system;
- *Operational Characteristics* – The operating plan defines the hours of operation, the frequency of service, anticipated travel times, anticipated fares, and fare collection equipment;
- *Project Costs* – Costs include the overall capital costs, as well as the costs to operate and maintain the system; and
- *Construction Scenario* – This scenario identifies the major construction activities, the type of equipment that would be used, and the duration of construction.

The above information has been obtained from the eBART project team tasked with conducting the planning, preliminary engineering, and costing for the Proposed Project. The project description reflects *preliminary* engineering. Changes and refinements to the above project

features would be expected during final design, which would occur following environmental review.

2.2 TECHNOLOGY

Description

The Proposed Project would employ rail vehicles known as Diesel Multiple Units (DMUs). DMU is the identifying name for a utilitarian family of self-propelled rail cars that can be coupled together. The amenities and operating characteristics of these rail cars resemble BART vehicles, but generate their own power and operate on a standard gauge (4 feet 8.5 inches) rail track. The power comes from an on-board diesel engine. Similar self-propelled vehicles can operate with an electric motor receiving power from an overhead wire. These electrified light-rail vehicles, or LRVs, are discussed in greater detail in Section 5, Alternatives.

DMU technology is common in Europe and has had several successful applications in the United States. DMU service was initiated in New Jersey between Trenton and Camden in 2004, and DMU service began recently on the Sprinter line, a 22-mile-long line linking the North San Diego County communities of Oceanside and Escondido. DMU systems are under development in Sonoma and Marin Counties in the San Francisco Bay Area; Austin, Texas; Raleigh, North Carolina; and Miami, Florida.

For the Proposed Project, the alignment runs in a freeway median on exclusive tracks, so that there is no potential for the DMUs to conflict with automobiles or other rail traffic. Therefore, the operation of the Proposed Project in the SR 4 median is not subject to Federal Railroad Administration (FRA) regulations. This allows the use of the more readily available non-FRA-compliant vehicles.¹ Most of the DMUs available today were designed to European standards, and they do not satisfy FRA standards. The project will be subject to the requirements of the California Public Utilities Commission, which is responsible for ensuring the public safety of all transit systems. It should be noted that while the Proposed Project involves a particular technology, a specific supplier or the precise vehicle specifications have not been identified. BART has defined minimum performance specifications that will have to be satisfied by prospective suppliers. Therefore, this project description and the subsequent analysis in Section 3 are intended to cover a range of different vehicle types that meet the performance specifications outlined by BART.

¹ In order to operate on rail lines governed by the FRA, vehicles are required to have sufficient structural strength to operate on the same tracks as freight train traffic. Vehicles that comply with FRA standards are called "FRA compliant vehicles."

Propulsion Systems

Some of the DMUs are powered by diesel engines, which drive an axle through a hydraulic torque converter, and some DMUs utilize direct mechanical or electrical transmissions. DMUs configured to use diesel engines to generate electricity, which, in turn, power electric propulsion motors, also have come into widespread use. The diesel engines can burn low sulfur diesel fuel and would meet state and federal air quality standards. These diesel engines belong to a newer generation of engines known as “clean diesel.”

Vehicles

DMUs are adapted from a standard railway coach but are powered by diesel engines placed beneath the vehicle floor. Any number of cars can theoretically be connected together to form a train, and all the propulsion systems are controlled from the single operator’s station or cab. There are control systems at each end of the train “set”² and multiple sets can be connected together. Distribution of the propulsion among the cars results in a system that is less vulnerable to single-point-of-failure outages.

For the Proposed Project, two articulated cars would be operated in coupled pairs for the initial peak hour operations, and three-car trains could be put into service in the future. Single-car service could be provided on weekends or during periods of lighter passenger demand.

DMU cars are designed with the most modern features, and because many are patterned after European designs, they have a modern appeal. Some of their design features include:

- *Wide Doors* – This feature allows faster and easier boarding. In addition to increased width, some designs allow for doors on both sides of the vehicle, allowing for more flexibility in station design.
- *Panoramic Windows* – Newer construction methods for all vehicles allow for more expansive use of glass. Many vehicles have window areas that extend lower than previous vehicle designs and give a feeling of greater spaciousness and freedom to the vehicle and thus the trip.



A two-vehicle Siemens Desiro Classic DMU set

² Multiple cars that are linked together form a train, which is also known as a “train set” or “set.”

- *Applied Ergonomics* – Vehicle interiors are designed with high levels of comfort. Passenger rail cars normally have wide aisles for movement within the vehicle during the trip.
- *Upgraded Seating* – Seating configurations can be designed similar to existing BART seating or traditional passenger train configurations.
- *Accessibility* – Doors can be set at platform level to facilitate ease in boarding and alighting, especially for conformance with the Americans with Disabilities Act (ADA) standards.
- *Electronics* – Enhanced electronics are available for information signs and other media, and for good lighting and temperature control.

2.3 ROUTE/ALIGNMENT

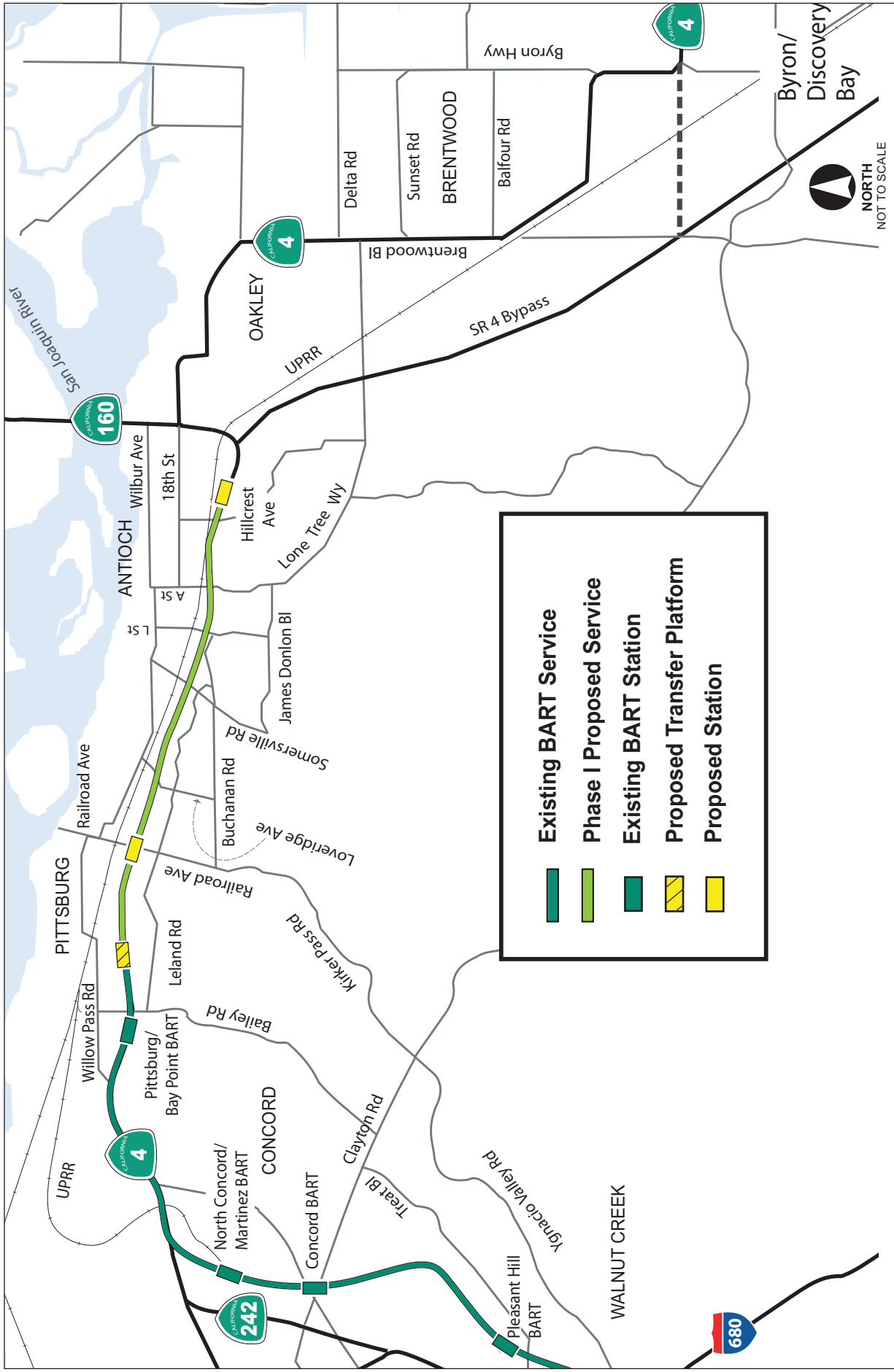
Horizontal and Vertical Alignment

The Proposed Project (including maintenance facilities) would extend approximately 10 miles from the Pittsburg/Bay Point BART Station eastward via the median of SR 4 (see Figure 2-1). The distance from the Pittsburg/Bay Point BART Station to the terminus station platform in the median east of Hillcrest Avenue is 9.1 miles; the remaining approximately 0.9 miles is for train storage and maintenance.

The Proposed Project would have an exclusive right-of-way in the median, and there would be no conflicts with vehicular traffic. All the street crossings between the Pittsburg/Bay Point BART Station and the Hillcrest Avenue Station would be grade separated. The DMU tracks would remain at grade within SR 4, as the DMU follows SR 4 through the project corridor. Where SR 4 crosses over roadways, aerial structures to carry the DMU would be required.

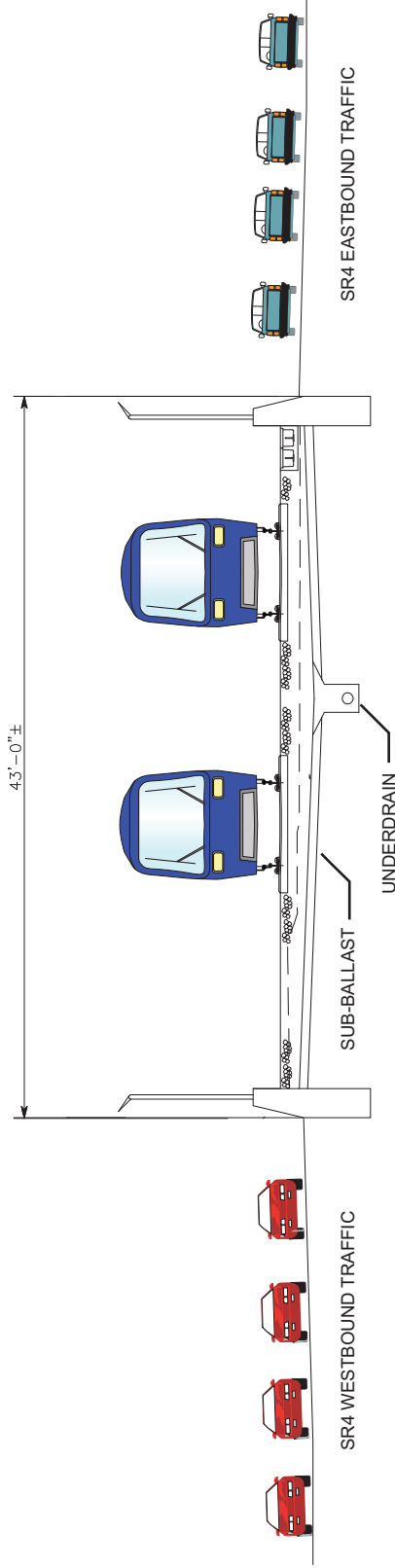
Sufficient width has already been provided in the median of SR 4 for a transit system during recent SR 4 improvements from the Pittsburg/Bay Point BART Station to the Loveridge Road interchange. Caltrans, in cooperation with CCTA, is currently planning the widening of the SR 4 median to accommodate a transit system from the Loveridge Road interchange to the SR 160 interchange as part of its SR 4 improvement program. Typical cross-sections of the SR 4 median with the Proposed Project are illustrated in Figure 2-2.

The system would operate two tracks for its entire length, with the exception of a short section of single track that would bring the DMU trains into the transfer platform at the Pittsburg/Bay Point BART Station. This transfer platform is solely for the purpose of transferring between the BART and DMU vehicles; this facility provides no means for passengers to enter or exit the transit system at this platform. There would be two new passenger access stations along the route, not including the existing Pittsburg/Bay Point BART Station:

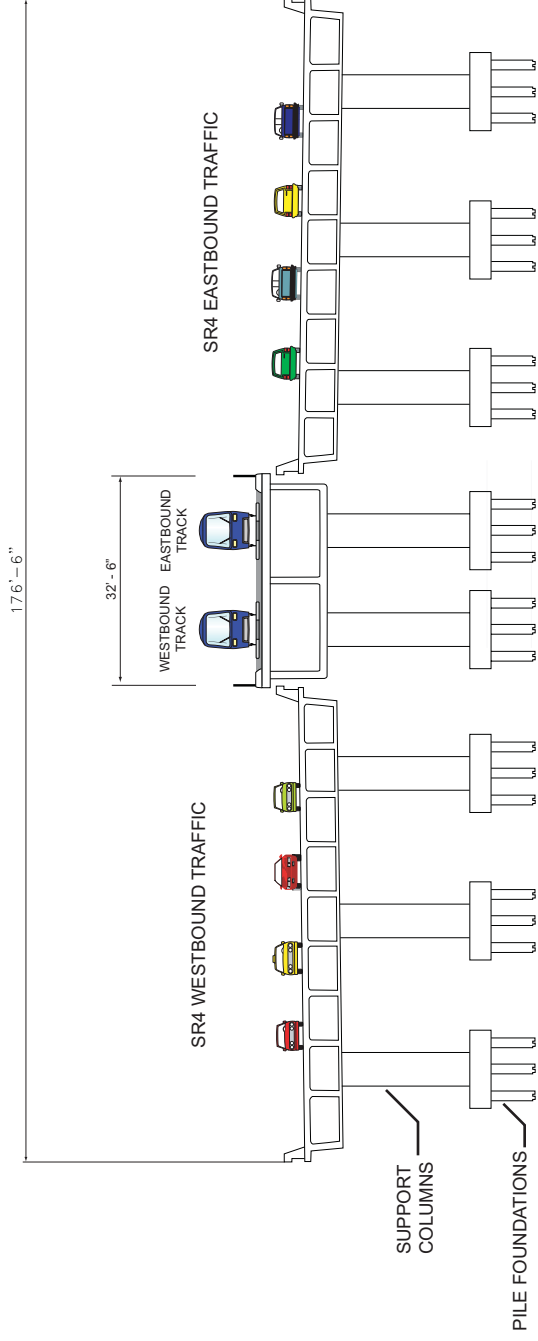


Source: BART, 2008.

PROPOSED DMU ALIGNMENT
FIGURE 2-1



A. BETWEEN PITTSBURG/BAY POINT AND RAILROAD AVENUE



B. BRIDGE AND ROAD SECTION

Source: PGH Wong, 2008.

- the Railroad Avenue Station; and
- the Hillcrest Avenue Station in the median that would be the eastern terminus of the Phase 1 of the Proposed Project.

To provide a clear description of the Proposed Project, the alignment is described below by segments:

- Pittsburg/Bay Point BART Station to DMU transfer platform;
- DMU transfer platform to Loveridge Road interchange; and
- Loveridge Road interchange to Hillcrest Avenue Station.

Pittsburg/Bay Point BART Station to Pittsburg/Bay Point DMU Transfer Platform. The DMU transfer platform would be constructed in the median adjacent to the existing BART tailtracks, approximately 2,750 feet to the east of the existing Pittsburg/Bay Point BART passenger platform. BART trains would have their new terminus at the new transfer platform. DMU vehicles would operate to the east of the transfer platform. The transfer platform is designed to accommodate cross-platform passenger transfers between the BART and DMU systems.

No major changes would be made to the existing Pittsburg/Bay Point BART Station or the area outside the highway median. The station would retain the existing 2,036 parking spaces. Further details on the transfer platform are provided in Section 2.4 below.

DMU Transfer Platform to Loveridge Road Interchange. From the DMU transfer platform eastward, the DMU tracks would follow the SR 4 median at grade. The DMU would pass under the Railroad Avenue overpass and the Harbor Street overpass as do the SR 4 highway lanes. The Railroad Avenue Station is included in this route segment. The Railroad Avenue Station location, facilities, design, access, and parking details are described in Section 2.4.

Loveridge Road Interchange to Hillcrest Avenue Station. The proposed DMU guideway would traverse the highway underpass at Loveridge Road and continue easterly in the SR 4 median to a station on the east side of Hillcrest Avenue. The alignment in this segment also would include six new aerial structures to separate the guideway from cross streets. Aerial structures are proposed at the following locations:

- Utility Corridor – single span: 80 feet
- Century Boulevard – single span: 90 feet
- Somersville Road – double span: 115 feet
- L Street (Contra Loma Boulevard) – double span: 65 feet
- A Street (Lone Tree Way) – double span: 80 feet
- Cavallo Road – single span: 117 feet

The alignment would pass under G Street and Hillcrest Avenue. Caltrans improvements include replacement of the G Street Bridge and modifications to the Hillcrest Avenue interchange. The proposed Hillcrest Avenue Station would be the eastern terminus of this route segment. Station location, facilities, design, access, parking, and maintenance facility details are provided in Section 2.4.

Caltrans SR 4 Median Widening

As noted above, recent Caltrans improvements to SR 4 have provided sufficient width in the median of SR 4 for a transit system from the Pittsburg/Bay Point BART Station to the Loveridge Road interchange. In the already constructed Pittsburg/Bay Point to Loveridge Road interchange segment of SR 4, Caltrans has provided a widened median, median subgrade, underdrains (in portions), and median barriers (in portions) of the SR 4 alignment. Caltrans, in cooperation CCTA, is planning the expansion of the SR 4 median to accommodate a transit system from the Loveridge Road interchange to the SR 160 interchange.

Future System Extension

The current eBART project is the first phase (Phase 1) of a potential transit service that could extend all the way to Brentwood and Discovery Bay in the east. Therefore, it is important for the project to retain the ability to be extended beyond Antioch in the future. The Proposed Project, as well as all the optional station locations, provides an alignment that could be extended. The Proposed Project could be extended eastward along either the median of SR 4 or along the Union Pacific (UP) Mococo Line.

2.4 STATIONS

The Proposed Project would include two DMU stations and an interface, or transfer platform, east of the Pittsburg/Bay Point BART Station. Features of each station/platform are described below.

Pittsburg/Bay Point BART Station and DMU Transfer Platform

Location. The existing two-story Pittsburg/Bay Point BART Station is located on the block bounded by West Leland Road to the south, Bailey Road to the east, the eastbound lanes of SR 4 to the north, and a vacant parcel zoned for utility/ROW to the west. The BART station platform is located at grade in the median of SR 4 and is reached by an elevated pedestrian concourse over the eastbound lanes of SR 4. BART trains currently approach the station on an at-grade guideway from both the east and west. The parking lot and a Tri Delta Transit bus transfer facility are located to the south of the station structure and platform.

Under the Proposed Project, no major modifications would be made to the existing passenger portions of the Pittsburg/Bay Point BART Station, but modifications would be made to the station's tailtracks east of the station.

BART's commitment to the public is to create a seamless cross-platform transfer between BART and the DMU trains. After stopping at the existing BART platform just west of Bailey Road, eastbound BART trains would continue another 2,750 feet to the new transfer-only platform east of Bailey Road, where a DMU train would be waiting. Figure 2-3 illustrates the location of the transfer platform. BART passengers would walk across the platform and board the waiting DMU train, which would depart within 3 minutes. Westbound travelers on the DMU service would find a BART train waiting for them upon arrival at the transfer platform and make the same 3-minute transfer. There would be no fare gates or other barriers on the transfer platform.

Facilities/Design. The DMU transfer platform would be located in the area currently occupied by a storage track and would include an at-grade, 700-foot-long concrete platform. The platform would contain signage, trash receptacles, lighting, and canopies. Figure 2-4 illustrates a cross-section of the proposed transfer platform and a rendering of passengers making the cross-platform transfer between BART and DMU trains.

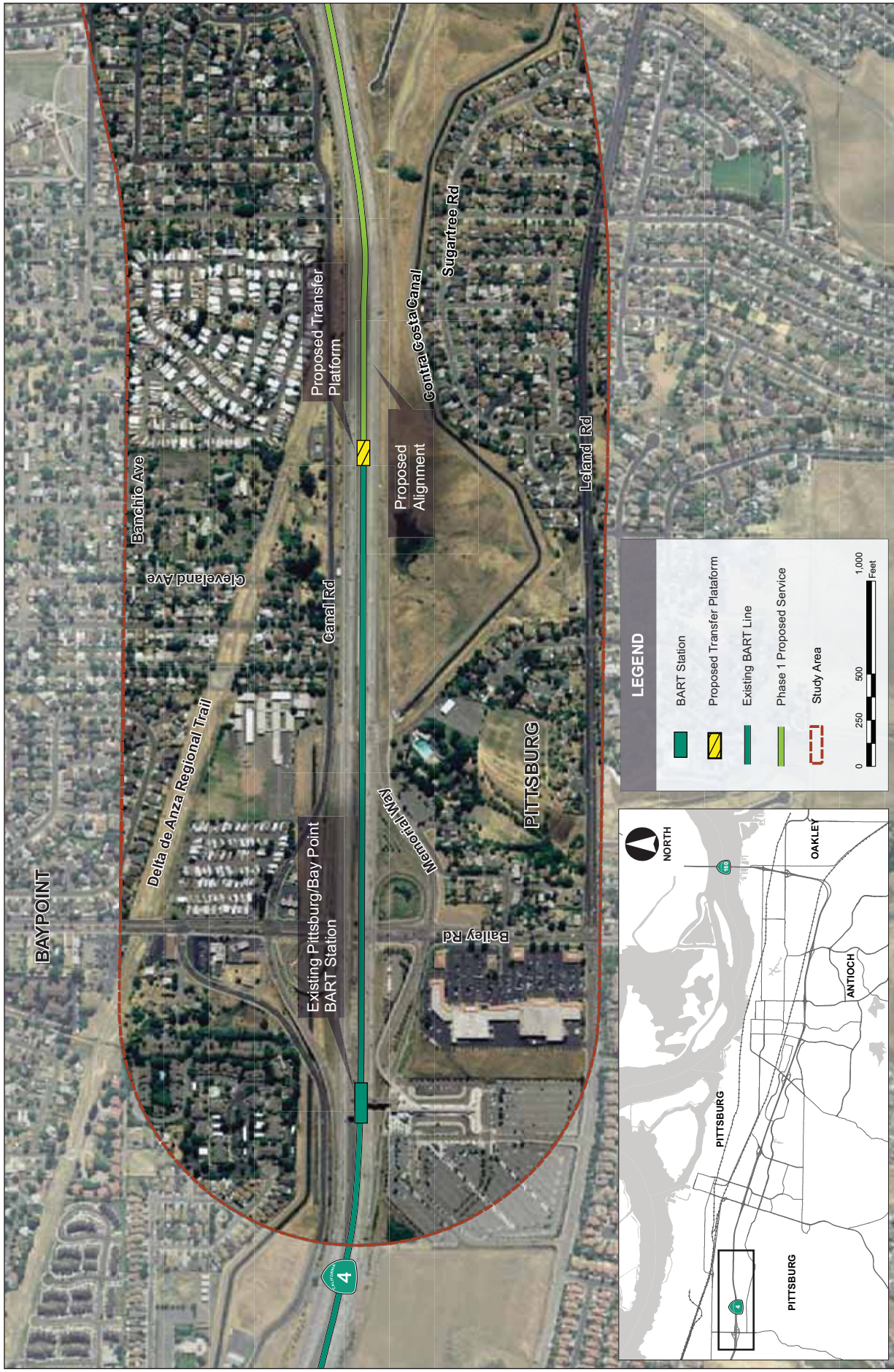
Extended tailtracks would be constructed immediately to the east of the transfer platform to provide storage for three 10-car BART trains. A turnout (a section of track used for storing trains or getting disabled trains off the mainline) would be added to access the BART track that would be extended to accommodate one BART 10-car train. The existing BART track would be removed to accommodate the new DMU guideway along the south side of the transfer platform. This area would be elevated approximately 1 to 1.5 feet to raise the DMU vehicle doors to the platform level.

Access. Use of the transfer platform would be limited to passengers transferring between BART and the DMU trains, and thus, there would be no pedestrian access from the BART station or from either side of SR 4. Because of this limited access, there is no requirement for stairs, escalators, or a concourse area for public use except for emergency ingress and egress at the west end of the transfer platform.

Parking. There would be no parking at the transfer platform. The nearest patron parking to the transfer platform would be the 2,036 existing spaces at the Pittsburg/Bay Point BART Station. No additional parking is planned for this location.

Ancillary Facilities. In addition, to the standard components described above, the transfer platform would require additional ancillary facilities.

Ancillary Building/Train Control. A 1,800-square-foot single-story ancillary building would be constructed to house an electrical room and two rooms for train controls (both BART and DMU train control). There are two possible locations for the ancillary building. The first

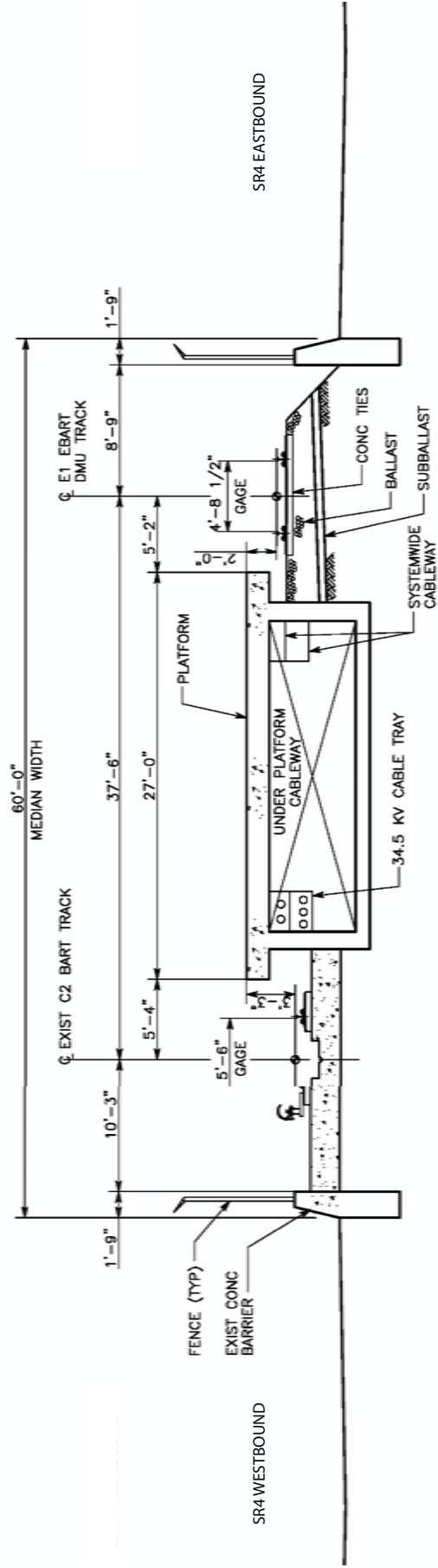


Source: PGH Wong, BART, PBS&J, 2008.

EXISTING PITTSBURG/BAY POINT BART STATION AND PROPOSED TRANSFER PLATFORM
FIGURE 2-3



Simulated view of transfer platform in SR 4 median looking east



Source: PGH Wong, 2008; Arup, 2008.
 Note: This simulation does not include the staff building that may be constructed at the east end of the transfer platform. The staff building could be two to three stories.

TRANSFER PLATFORM SECTION
FIGURE 2-4

location is at the west end of the transfer platform. New duct banks would be constructed from the existing maintenance-of-way tunnel to the new ancillary building and transfer platform. New PG&E electrical service for auxiliary power to the transfer platform would feed from the existing BART vehicle cleaning building through the maintenance-of-way tunnel to the transfer platform.

A second possible location for the ancillary building would be outside the median and adjacent to the maintenance-of-way tunnel entrance on the north side of SR 4. The site is located on Caltrans' property that is currently used for parking. Twelve parking spaces would need to be replaced. This location would also require modification of the existing maintenance-of-way tunnel within the median to enhance access between the ancillary building and the transfer platform.

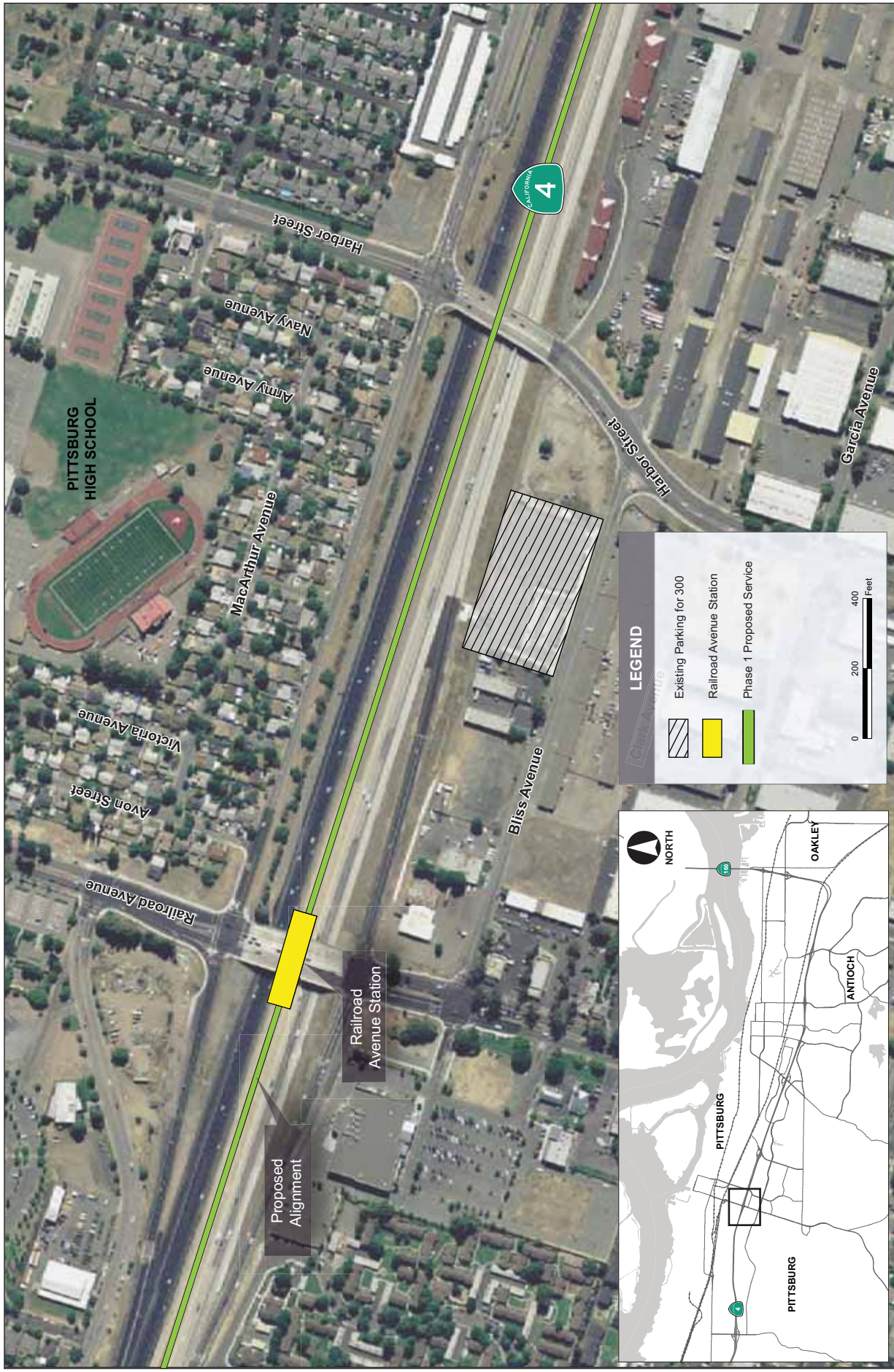
Staff Building. The extension of BART service to the transfer platform may require a staff building. If required, the staff building would be two or three stories in height, approximately 3,000 square feet in size. The staff building would be located at either the east end of the transfer platform or on the north side of SR 4 near the maintenance-of-way tunnel. A staff building would also require approximately 25 additional employee parking spaces on Canal Road near the entrance to the maintenance-of-way tunnel.

Emergency Vehicle Access. Emergency vehicle access would be provided via a gate from the SR 4 eastbound interior lane through the concrete traffic barrier and fence to a 300-foot paved area, which would be located west of the transfer platform. This paved space would provide a refuge area and parking for emergency response vehicles. The west end of the platform includes a 40-foot-long ramp (wide enough for maintenance carts) and stairs to access the platform level for emergencies and maintenance.

Railroad Avenue Station

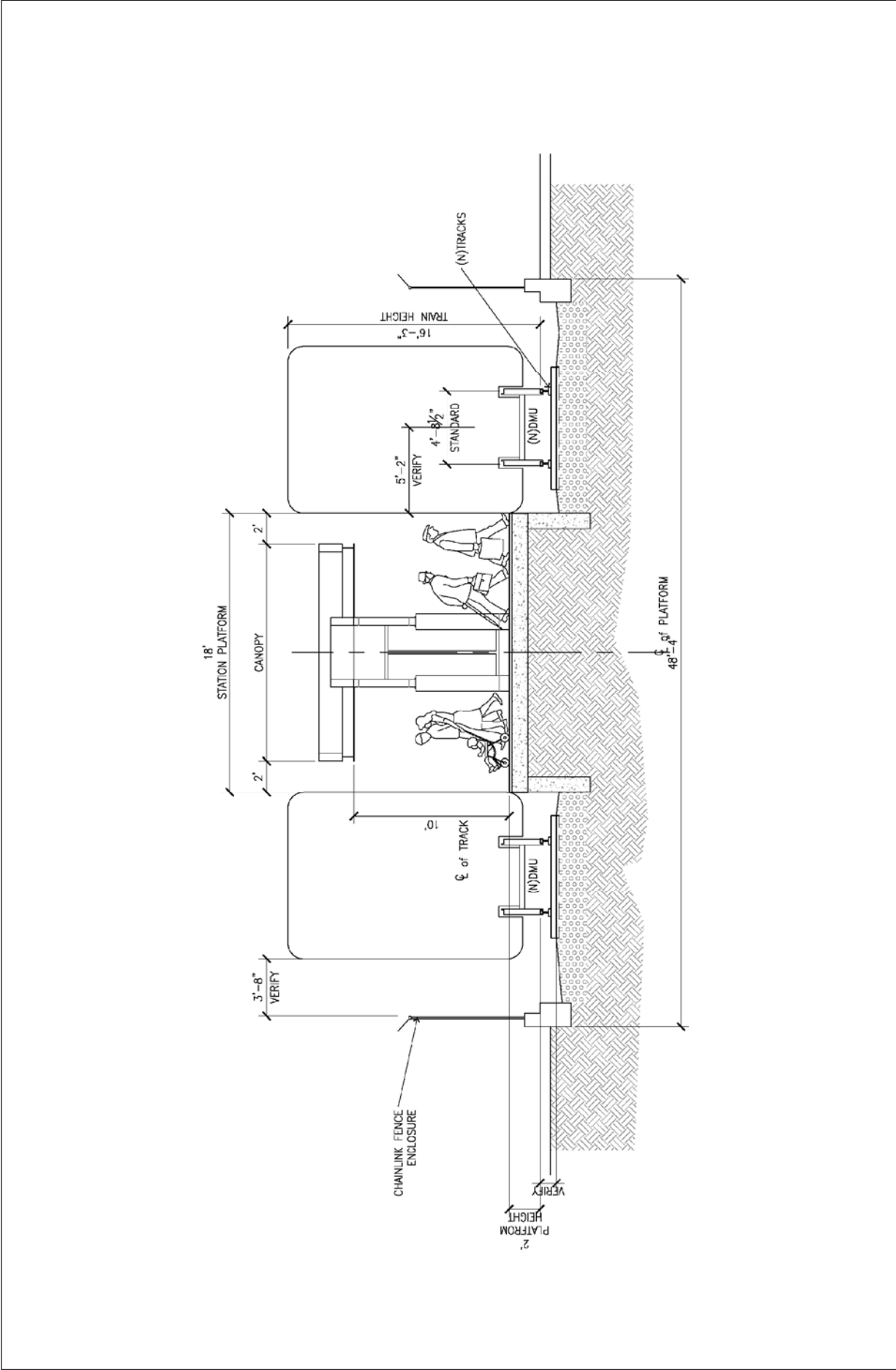
Location. The Railroad Avenue Station is located at the intersection of Railroad Avenue and SR 4 in the City of Pittsburg. The station would be in the median of SR 4 and located beneath the Railroad Avenue overcrossing (see Figure 2-5).

Facilities/Design. The DMU station would consist of a 25-foot-wide, 410-foot-long, and 2-foot-high cast-in place concrete platform with footings located at grade beneath the Railroad Avenue overpass. The platform would have power and communication utilities (public address system and closed circuit television). The platform would contain benches, windscreens, signage, trash receptacles, lighting, canopies, and cabinets for maps and schedules. A cross-section of the station is presented in Figure 2-6 and an elevation of the station is depicted in Figure 2-7.



Source: PBS&J, 2008.

RAILROAD AVENUE STATION AREA AND CONCEPTUAL STATION PLAN
FIGURE 2-5



Source: PGH Wong, 2008.

RAILROAD AVENUE STATION SECTION
FIGURE 2-6

Access. Access to the DMU station platform would be from the sidewalks on the west and east sides of the Railroad Avenue overpass, where one stairway and one elevator on each side of the overpass would descend to the DMU platform below. A pedestrian bridge from the east end of the station platform to the south side of the freeway over the eastbound lanes of SR 4 is also being planned, although it may not be constructed as part of the initial construction.

Vehicle Access and Parking. The existing Park-and-Ride Lot at Railroad Avenue has 185 spaces located on the south side of SR 4, between SR 4 and Bliss Avenue, approximately 1,000 feet east of Railroad Avenue (see Figure 2-5). Currently, the lot is not fully utilized; however, in the year of opening, the lot would be reconfigured to provide 300 spaces. No additional parking lots would be provided as part of the Proposed Project.

Station Area Development. The City of Pittsburg has prepared the Railroad Avenue Specific Plan for the area within a one-half mile radius of the proposed DMU station site. The purpose of the plan is to guide future development in the area. Although not a part of the Proposed Project, transit-oriented development is being proposed by the City of Pittsburg as part of the Railroad Avenue Specific Plan. The Railroad Avenue Specific Plan fulfills the requirement for a Ridership Development Plan in accordance with BART's System Expansion Policy, which is discussed in greater detail in Section 3.3, Land Use, of this Draft EIR.

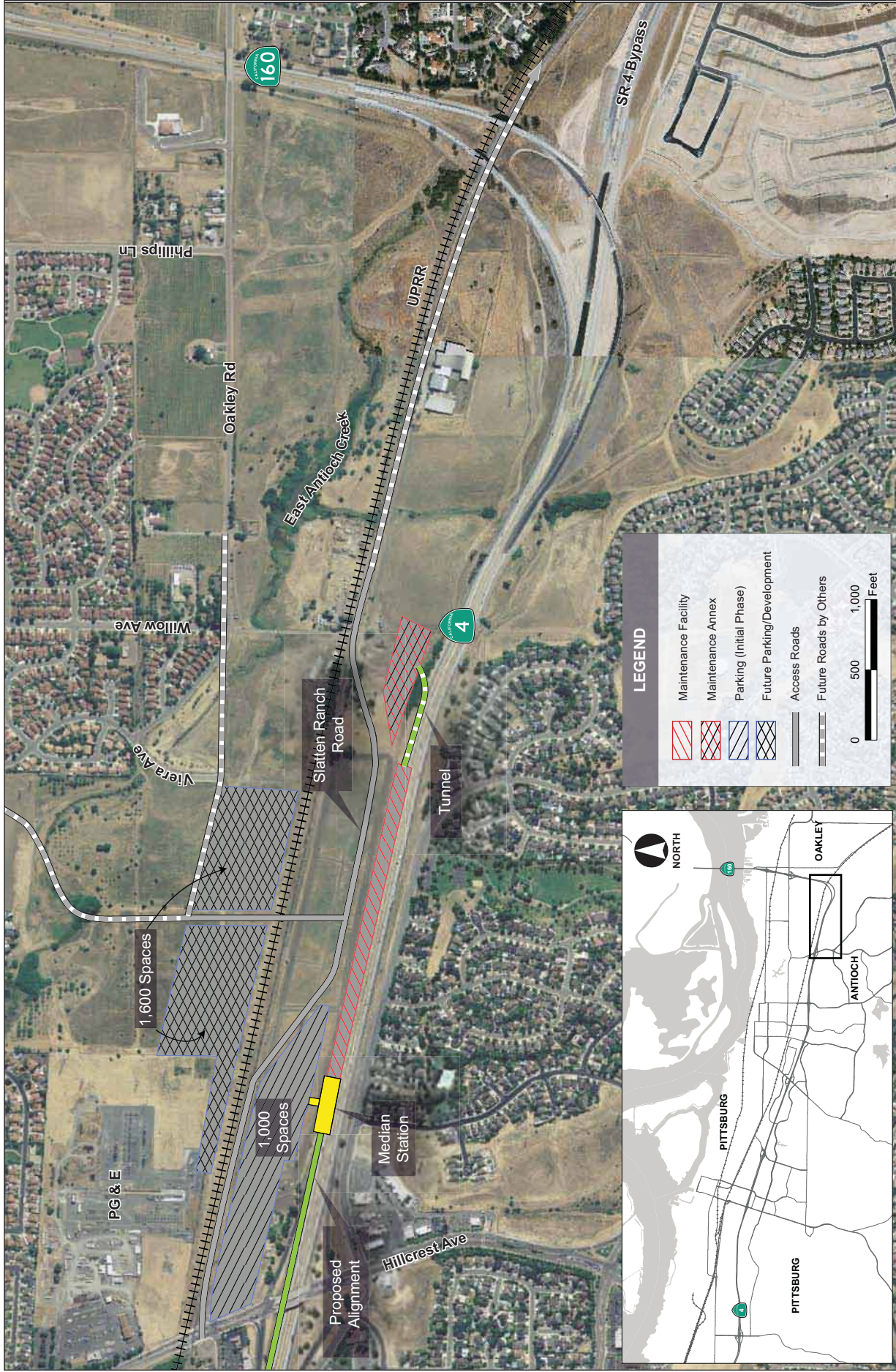
The City of Pittsburg envisions a "transit village" south of SR 4 and east of Railroad Avenue. The transit village would include a mix of residential and commercial uses with development focused around the Railroad Avenue Station. At some point in the future, once future development provides sufficient replacement parking in the project area, the 300-space existing BART park-and-ride lot would be integrated with the planned transit village. The paving and site amenities at the existing Bliss Avenue BART Park-and-Ride Lot likely would be removed, and the site redeveloped as part of the future transit village. Access would continue to be by means of pedestrian walkways to access the DMU station stairways and elevators at the center of the overpass.

Ancillary Facilities. The Railroad Avenue Station would include a train control room. The train control room would be located either at the Railroad Avenue Station or east of the platform in the median. The train control room would be approximately 200 square feet in size.

Hillcrest Avenue Median Station

Location. The Proposed Project includes a DMU station in the median of SR 4, 1,275 feet (0.24 miles) east of the intersection of Hillcrest Avenue and SR 4 in the City of Antioch, and this station would be the terminus for the Proposed Project (see Figure 2-8).

There are three station location options for the Hillcrest Avenue Station in addition to the Median Station: a station north of SR 4, approximately 3,500 feet (0.66 miles) east of Hillcrest



Source: PGH Wong, 2008; PBS&J 2008.

HILLCREST AVENUE MEDIAN STATION AREA AND CONCEPTUAL STATION PLAN
FIGURE 2-8

Avenue (Northside West Station); a station north of SR 4, approximately 6,800 feet (1.29 miles) east of Hillcrest Avenue (Northside East Station); and a station in the median of SR 4, approximately 2,175 feet (0.38 miles) east of Hillcrest Avenue (Median Station East). These three station location options also are evaluated in this Draft EIR.

Facilities/Design. The DMU platform for a maximum three-car train is a concrete structure 410 feet long, 27 feet wide, and approximately 2 feet high. The platform would have power and communication utilities (public address system and closed circuit television). It would also contain benches, windscreens, signage, trash receptacles, lighting, canopies, and cabinets for maps and schedules.

Vehicle Access and Parking. An approximately 40-acre parking area for 2,600 parking spaces is planned on the north side of SR 4. Construction of the parking would take place incrementally; approximately 1,000 spaces (including 20 ADA spaces) on approximately 20 acres would be constructed as part of the initial phase (by the year 2015) and the remainder by 2030 (see Figure 2-8). The parking area is located in the northeast quadrant of the SR 4/Hillcrest Avenue interchange, near the current BART park-and-ride lot. The future surface parking lots may be integrated with future development envisioned by the City's Ridership Development Plan, or satisfied on the site designated for parking provided during the year of opening through structural parking rather than surface lots. Antioch has agreed to work with BART and others to secure funding for Hillcrest Station-related parking and access. As part of the Proposed Project, an extension of Slatten Ranch Road and Viera Avenue would be constructed to provide access to the parking lot. Slatten Ranch Road would extend east only far enough to serve the DMU station and maintenance area but is not planned to extend further as part of the Proposed Project.

Platform Access. Patron access to the Median Station platform would be via an entrance structure from the parking area adjacent to the north side of SR 4. The pedestrian concourse linking the parking area and station platform would be elevated over the westbound traffic lanes of SR 4 (see Figure 2-9). The pedestrian concourse would include elevators and stairways at each end of the pedestrian overpass.

Station Area Development. The City of Antioch is anticipating development of the Hillcrest Avenue Station area and is preparing a specific plan for approximately 375 acres of undeveloped land immediately north of SR 4 and on both sides of the Union Pacific Railroad right-of-way (UP ROW), which parallels SR 4 approximately 450 feet to the north. The undeveloped area would be transformed into a mid- to higher-intensity mix of residential, commercial, and public uses. Like the Railroad Avenue Specific Plan in Pittsburg, the Hillcrest Station Area Specific Plan in Antioch will fulfill the BART System Expansion Policy requirement for local jurisdictions to prepare transit-oriented development plans and access improvements to enhance system ridership. The Hillcrest Station Area Specific Plan is discussed in further detail in Section 3.3, Land Use.

Ancillary Facilities. A number of appurtenant and support facilities would be constructed at or near the Median Station as described below.

Maintenance Facilities. The Median Station would require tailtracks, a maintenance facility, and a storage yard east of the platform (see Figure 2-8). The maintenance facility would be designed to accommodate the servicing and periodic maintenance of the DMU fleet vehicles. Everyday fueling, vehicle cleaning, washing, and routine light vehicle maintenance activities would be carried out at this facility.

For the Median Station, maintenance operations would take place both in the SR 4 median, immediately east of the platform, and at a site adjacent to the north side of SR 4. Train storage and cleaning, train washing, and fueling would take place on the tailtracks east of the median passenger platform. The maintenance areas would include a fueling station containing two above-ground 50,000-gallon fuel oil storage tanks with containment berms. A 2.8-acre DMU storage area and maintenance yard north of SR 4, referred to as the maintenance annex, would serve a variety of operations, including a 4,000-square-foot central maintenance office and general repair shop with 20 to 25 employee parking spaces. Other elements of the maintenance facilities and storage yard configurations would include:

- 1,200-square-foot spare truck parts and storage building (25 feet tall);
- 2,800-square-foot concrete de-trucking slab and pit with electric jack and canopy (20 feet tall);
- 4,000-square-foot train washer bay with a water reclamation system (20 feet tall);
- 1,200-square-foot train wash equipment and sand equipment building (15 feet tall); and
- 1,400-square-foot concrete slab fueling and sanding area with canopy (15 feet tall).

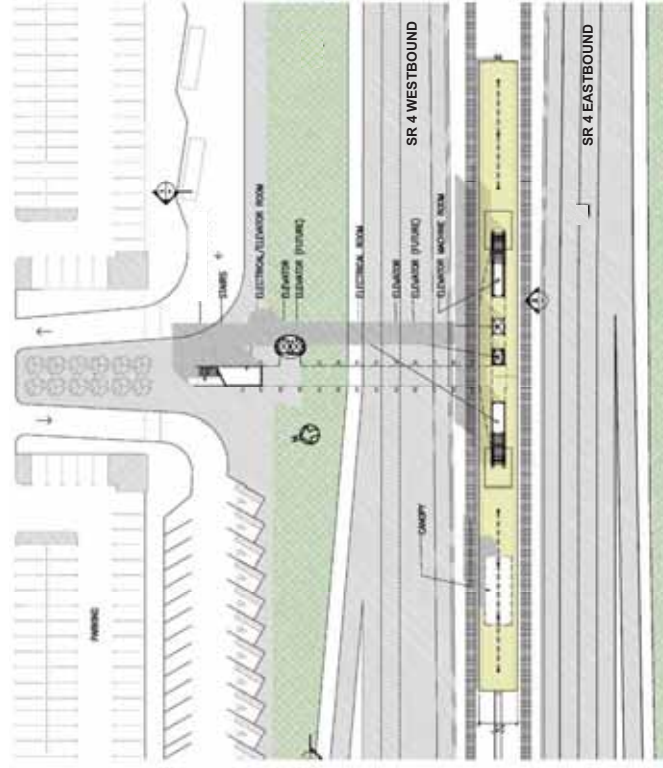
The maintenance annex would be connected to the operations area within the median by a maintenance-of-way tunnel under the westbound lanes of SR 4. Figure 2-8 shows the location of the maintenance annex and maintenance tunnel. All ancillary facilities would be fenced to prevent unauthorized access.

Central Control Facility. A centralized control center is needed to operate the DMU system independent of BART operations. The most likely location would be in the maintenance annex north of the SR 4 and immediately adjacent to the median access tunnel, integrated with the light maintenance shop.

Communications and Security. A dispatch, control, and monitoring desk in the Central Control Facility would be used to communicate with transit operations and maintenance personnel. Closed circuit television in stations would be monitored at the DMU central control facility. Communication would also link to BART's control center to allow synchronization of operations at the DMU transfer platform.



A. ELEVATION



B. PLATFORM PLAN

Source: PGH Wong, 2008.

Controls and Signals. To assure safe operations from the Proposed Project, track signals would be provided, as well as an integrated command, control, communications, and information system for controlling train movements. The automatic control system would take over and stop the train if a train operator fails to come to a stop as directed by the signal. Current plans are to equip the DMU vehicles with cab signal systems that enhance the safety of the high speed operations. This would assure that the DMU system meets California Public Utilities Commission requirements for enforced stops.

Train Control Huts. Train control huts would be located approximately every 1.5 miles along the project alignment. The one-story huts, approximately 216 square feet in size, would be located outside the median on sites accessible by public roads. The train control huts are placed on concrete pads approximately 12 feet by 18 feet, which in turn are placed within a fenced enclosure approximately 16 by 24 feet in size. Eight potential locations for train control huts have been identified. Optional sites have been identified for three of the locations. General locations are as follows:

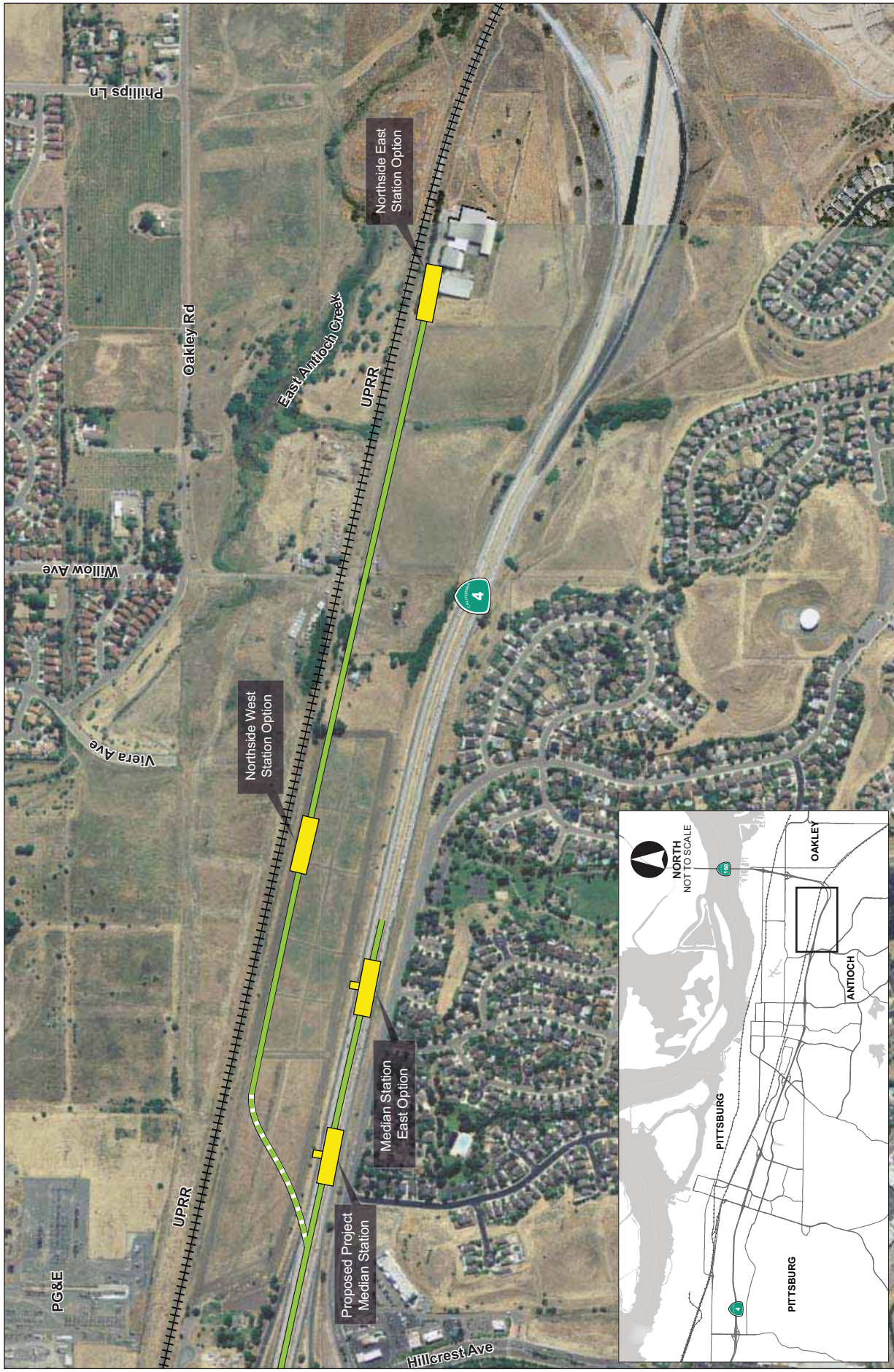
- South of SR 4 between Carpetta Circle and Niles Court;
- South of SR 4 near Frontage Road and Chelsea Way or north of SR 4 on Power Avenue near Andrew Avenue;
- North of SR 4 on California Avenue just west of the SR 4/Loveridge Road westbound on-ramp;
- South of SR 4 west of Century Boulevard;
- South of SR 4 within the SR 4/Somersville Road eastbound off-ramp or north of SR 4 within the SR 4/Somersville Road westbound off-ramp;
- South of SR 4 east of Contra Loma Boulevard or north of SR 4 east of L Street;
- North of SR 4 west of A Street; and
- South of SR 4 on Tregallas Road east of Garrow Drive.

Optional Hillcrest Avenue Station Locations

The DMU project includes the Median Station only; the other Hillcrest Station options described below would require additional funding. Figure 2-10 shows the Hillcrest Median Station and the three optional station locations.

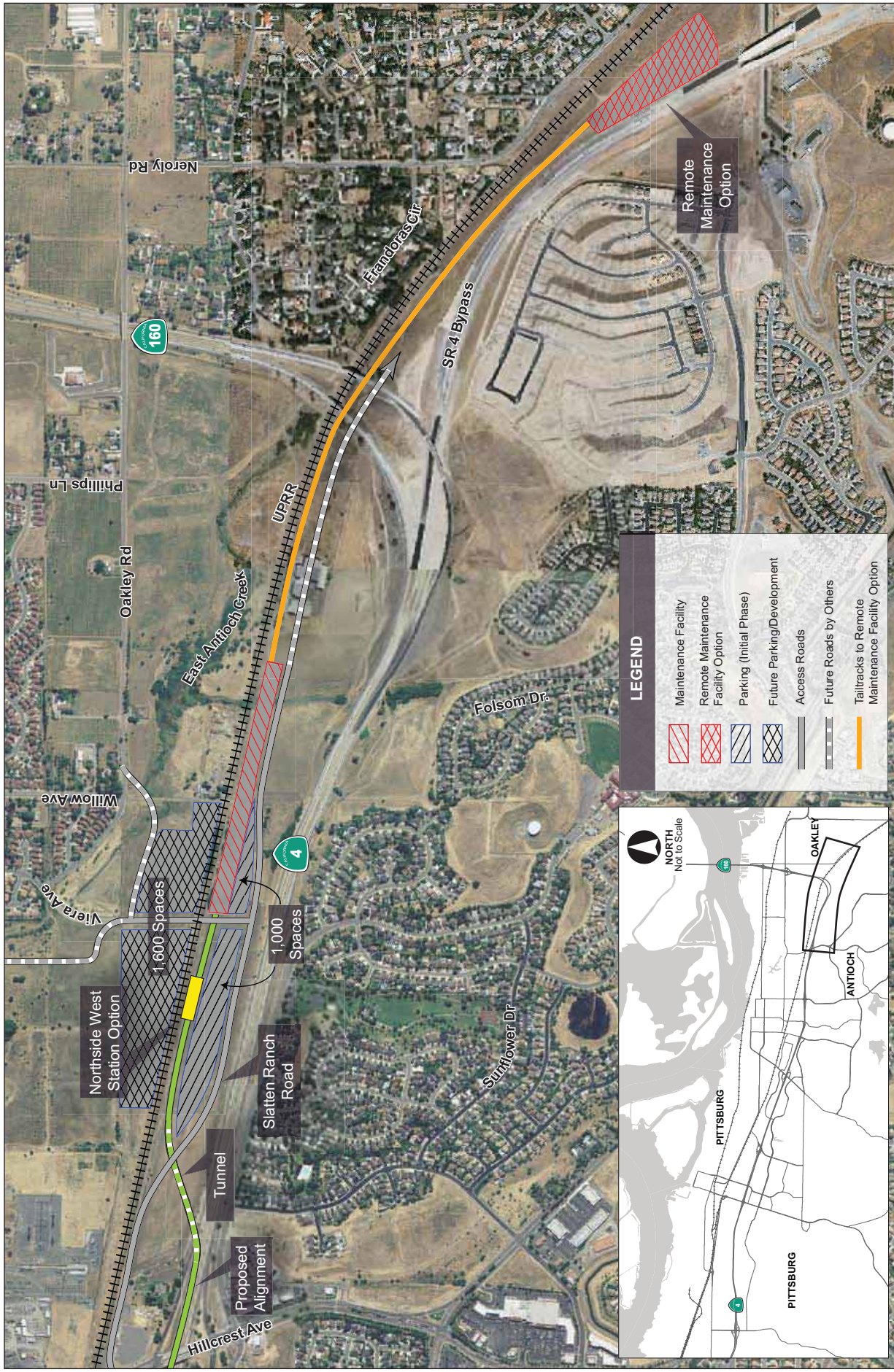
Northside West Station Option

Location. The Northside West Station option would be located north of SR 4 and adjacent to the south side of the UP ROW, approximately 3,500 feet (0.66 miles) east of Hillcrest Avenue, as shown in Figure 2-11.



Source: PGH Wong, 2008; PBS&J, 2008.

PROPOSED PROJECT AND HILLCREST AVENUE STATION OPTIONS
FIGURE 2-10



Source: PGH Wong, 2008; PBS&J 2008.

NORTHSIDE WEST STATION OPTION AREA AND CONCEPTUAL STATION PLAN
FIGURE 2-11

Facilities/Design. This station option would connect to the DMU alignment in SR 4 through a tunnel that would pass under the westbound lanes of the freeway and the Hillcrest Avenue interchange. Two versions of the tunnel are under consideration: a short tunnel from the median under the westbound freeway lanes that would end just north of the freeway (approximately 700 feet long) and a longer tunnel (approximately 1,500 feet long) extending further east and terminating close to the UP ROW. (The passenger platform would be in the same location under both tunnel options, only the length of the underground and at-grade trackway would vary.) The long tunnel would require mechanical ventilation, which would be supplied through two vent structures, one at each tunnel portal. All ventilation requirements would meet the requirements of the National Fire Protection Association (NFPA) 130.³

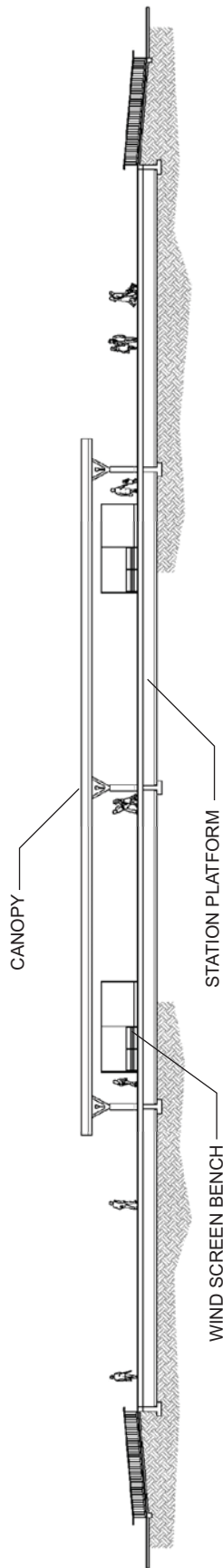
The Northside West Station option would consist of a single concrete platform (410 feet long and 27 feet wide) to accommodate a three-car train. As shown in Figure 2-12, the platform would be similar to the platform in the SR 4 median and would have power and communication utilities (public address system and closed circuit television). It would also contain benches, windscreens, signage, trash receptacles, lighting, canopies, and cabinets for maps and schedules. This one-level station would not need elevators.

Vehicle Access and Parking. Similar to the Proposed Project, 1,000 spaces would be implemented by 2015 and an additional 1,600 spaces would be provided by 2030, for a total of 2,600 spaces. The initial phase of parking would be provided between SR 4 and the UP ROW. Future parking has also been shown north of the UP ROW in Figure 2-11, although the areas designated for this later parking is proposed for development by the Ridership Development Plan. The plan contains provisions to replace these parking spaces elsewhere in the plan area convenient for passengers. These parking lots would be accessed via extensions of Slatten Ranch Road and Viera Avenue as shown in Figure 2-11.

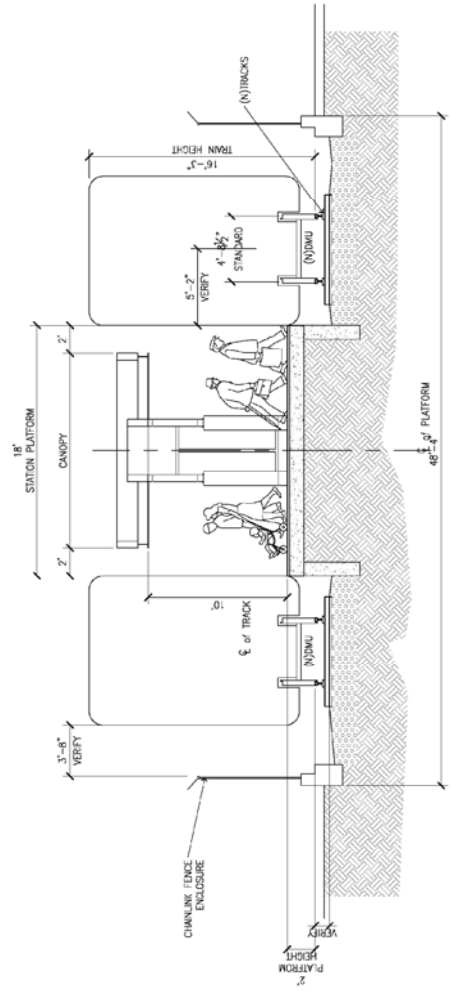
Platform Access. Station access would be available via bus, bike, and pedestrian routes from Oakley Road Extension, Viera Avenue to the north, and Slatten Ranch Road to the south. A pedestrian tunnel from the parking lot north of the UP ROW under the UP tracks also would be provided. Access to the platform would be at grade with patrons crossing the DMU tracks at crosswalks (if necessary) and then up ramps to the platform.

Required Improvements by Other Agencies. The Northside West Station assumes that Oakley Road, Viera Avenue, and Slatten Ranch Road would be extended to provide vehicle access to the Northside West Station site. Costs for construction of these road extensions are not included in the Proposed Project cost estimates and would be paid for by other agencies. In order to implement this station option, a source of such funding would have to be identified and funds committed.

³ National Fire Protection Association, 2007, Codes and Standards, www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=14, accessed July 22, 2008.



A. STATION ELEVATION



B. PLATFORM SECTION

Source: PGH Wong, 2008.

Ancillary Facilities. For the Northside West Station option, there are two possible locations for the maintenance facility (see Figure 2-11): the first would be immediately east of the station and the second would be east of SR 160 and the SR 4 Bypass near the Contra Costa Canal. In the first scenario, the 7.2-acre maintenance facilities and the storage yard would be placed in a long linear configuration immediately to the east of the station platform. The Northside West Station maintenance facility would include all the same elements as described for the Median Station maintenance and storage facility.

In the second scenario, the fueling, storage, and maintenance of the DMU vehicles would take place at a 8.8-acre remote maintenance facility that would be located in the vicinity of the Contra Costa County Water District canal, approximately 8,500 feet (1.6 miles) east of the station between the SR 4 Bypass and the Laurel Road intersection with Neroly Road (see Figure 2-11). Maintenance facilities would include the same elements as described for the Median Station maintenance facility. Access would be from a future extension of Slatten Ranch Road. The track alignment passing under the SR 160 flyovers of the UP ROW to access this remote maintenance facility would require reinforced benched earthwork and retaining walls at the Caltrans structures.

Communications Tower. Depending on the outcome of radio analyses conducted during final engineering, a 100-foot-tall radio communications antenna may be necessary at the remote maintenance facility to communicate with other facilities in the system. The antenna would most likely be of monopole design.

Northside East Station Option

Location. The Northside East Station Option would be located north of SR 4 and adjacent to the UP ROW approximately 6,800 feet (1.29 miles) east of Hillcrest Avenue. Similar to the other station options, this option requires the extension of Slatten Ranch Road for access (see Figure 2-13).

Facilities/Design. This station option would connect to the DMU alignment in the SR 4 median through the same alignment identified for the Northside West Station option. This alignment would involve a tunnel that would pass under the westbound lanes of the freeway and the Hillcrest Avenue interchange. As with the Northside West Station option, the same short and long tunnel options would be considered.

Similar to the Northside West Station option, the Northside East Station option would consist of a single concrete platform (410 feet long and 27 feet wide) to accommodate a three-car train. The platform would be similar to the platform in the SR 4 median and would have power and communication utilities (public address system and closed circuit television). It would also contain benches, windscreens, signage, trash receptacles, lighting, canopies, and cabinets for maps and schedules.

Vehicle Access and Parking. The area proposed for the 2,600 parking spaces for the Northside East Station option would occur entirely between SR 4 and the UP ROW. Unlike the preceding options, no parking would be planned north of the UP ROW; this layout has been proposed for this station option to avoid East Antioch Creek and its related flood hazards and wetland habitat (see Figure 2-13). One thousand spaces would be implemented by 2015 and an additional 1,600 spaces by 2030, for a total of 2,600 spaces. As with the other options, future parking may be integrated with development envisioned by the Antioch Ridership Development Plan or may be provided by redeveloping the 2015 surface parking area with a parking structure.

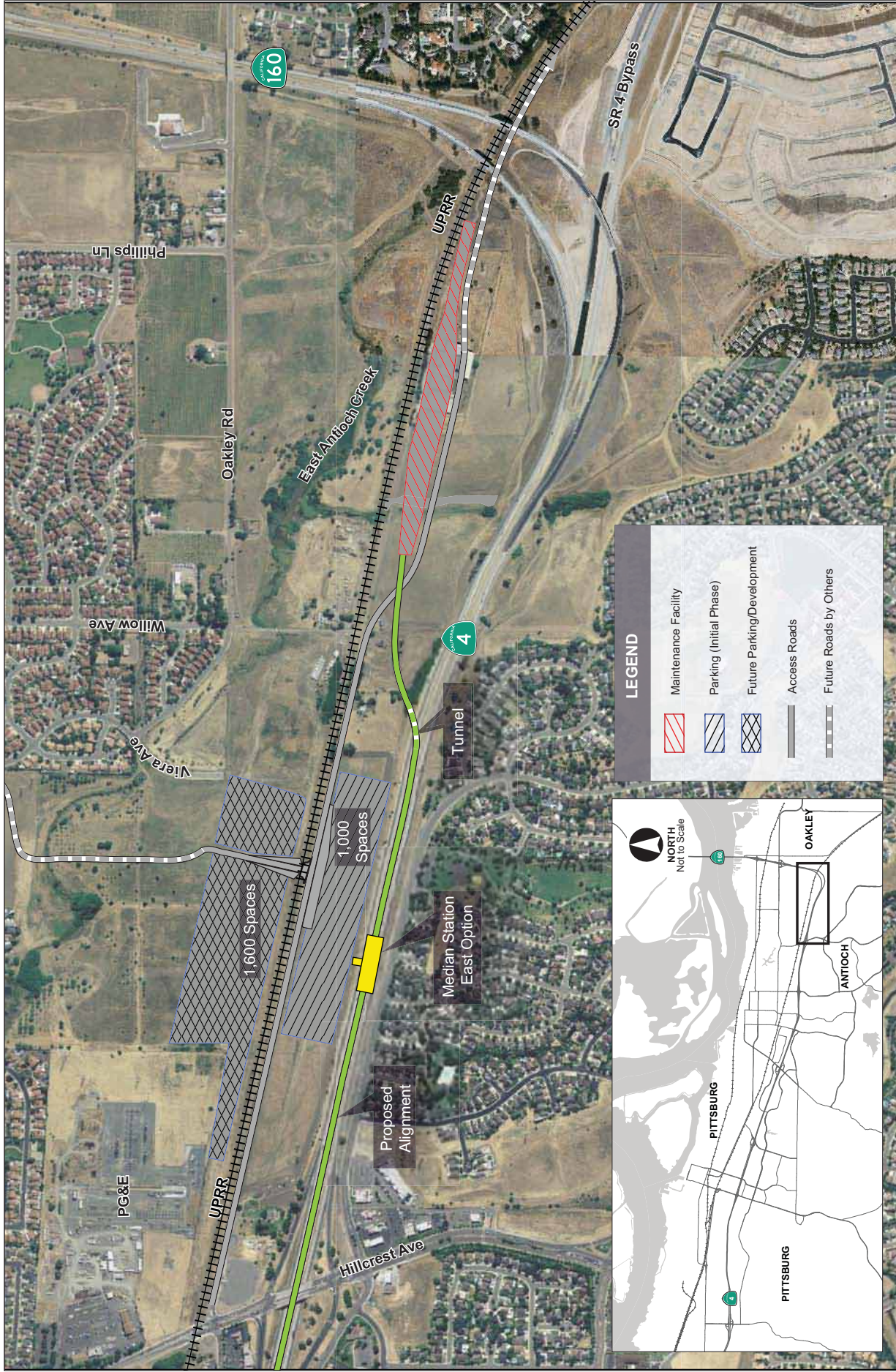
Platform Access. Station access would be available via bus, bike, and pedestrian routes from Slatten Ranch Road and Phillips Lane. Access to the platform would be at grade with patrons crossing the tracks at crosswalks (if necessary) and then up pedestrian ramps to the platform. A pedestrian crossing would be located to the south of the station providing connections between the parking area and the station platforms.

Required Improvements by Other Agencies. The Northside East Station option assumes that Slatten Ranch Road and Phillips Lane would be extended and connected, thereby providing vehicle access to the Northside East Station site. There is also the possibility of a further extension of Phillips Lane to a proposed new SR 4 freeway interchange just west of SR 160, but this interchange is speculative at this time. Costs for construction of these road extensions are not included in the Proposed Project cost estimates and would be paid for by other agencies. In order to implement this station option, a source of such funding would have to be identified and funds committed.

Ancillary Facilities. Maintenance for the Northside East Station option would take place at the remote maintenance facility. This site is in the vicinity of the Contra Costa County Water District canal, approximately 5,200 feet (0.98 miles) east of the station between the SR 4 Bypass and the intersection of Laurel Road and Neroly Road (see Figure 2-13). The description of this facility is the same as for the remote maintenance facility described above for the Northside West Station option. The remote maintenance facility of the Northside East Station would also include the potential 100-foot-tall communication tower.

Median Station East Option

Location. A third option to the proposed Median Station envisions shifting the station approximately 900 feet to the east within the median of SR 4. This option would site the “Median Station East” approximately 2,175 feet east of Hillcrest Avenue. Like the other Hillcrest Avenue Station options, the Median Station East would require the extension of Slatten Ranch Road eastward from Hillcrest Avenue (see Figure 2-14).



Source: PBS&J, 2008.

MEDIAN STATION EAST OPTION AREA AND CONCEPTUAL STATION PLAN
FIGURE 2-14

Facilities/Design. The platform would be similar to the platform proposed for the Median Station and would have power and communication utilities (public address system and closed circuit television). It would also contain benches, windscreens, signage, trash receptacles, lighting, canopies, and cabinets for maps and schedules. Similar to the Proposed Project, the Median Station East option would provide for a pedestrian overcrossing of SR 4 to connect the station platform with the parking areas north of SR 4.

Vehicle Access and Parking. Vehicular access to the Median Station East and its parking areas would be via the extension of Slatten Ranch Road. Approximately 1,000 parking spaces would be arrayed on either side of the pedestrian overcrossing, between SR 4 and the extension of Slatten Ranch Road. Future surface parking, approximately 1,600 spaces, would occupy additional acreage north of the UP ROW as shown in Figure 2-14, although this area is proposed for development by the Ridership Development Plan and would not be needed for surface parking if future parking needs could fully or partially be satisfied in the future development or in structured parking on the area shown in Figure 2-14 as “Parking (Initial Phase).”

Ancillary Facilities. Unlike the Proposed Project, the Median Station East option would have all of its maintenance activities and functions performed at a yard north of SR 4, adjacent to the UP ROW. A maintenance tunnel under westbound SR 4 would connect the Median Station East with the maintenance facility. The maintenance facility, which would be approximately 7 acres and house the same structures, equipment, and activities as the earlier described maintenance yards and shops, would generally be sited in the vicinity of the Northside East Station platform, as shown in Figure 2-14.

Future Phased Option

The Phased Option would allow the construction of the Median Station, which is largely funded, followed by the eventual construction of the Northside East Station, at such time as the additional funding is available for that station. The distance between the two stations allows the tracks to be extended from the Median Station to the location of the Northside East platform. The Median Station could continue to operate and would provide service to the park-and-ride passengers using the parking areas near the median station, as well as any transit-related development in the area. The Northside East Station would provide service for the new mixed-use development and TOD areas located around it. Maintenance facilities associated with the Median Station would be abandoned and would be replaced by facilities at the remote maintenance facility east of SR 160. This option would preserve the land use opportunities represented by an out-of median station location for a time when those opportunities could be realized.

Sustainability

The eBART project represents an opportunity to implement sustainable design that can take advantage of energy conservation, alternative energy systems, stormwater management, and judicious material selection in innovative ways that were not available when the original BART system was constructed. The eBART station sites and maintenance facilities would incorporate a number of sustainable elements into the project design and a variety of other sustainable practices are being considered. Determination of which sustainable practices would be included in the project, of those currently being considered, would be made during final design.

The project design will include the following features:

- High-efficiency lighting and lighting control methods to reduce electricity consumption;
- Reduction in light spillage (and energy) through use of appropriate fixtures and lower lumens;
- Energy efficient systems where feasible, such as solar hot water, more efficient HVAC (heating, ventilation and air conditioning) and vertical transportation; and use of meters to track energy use;
- Sustainable landscaping using xeriscaping and drought-tolerant plants;
- Swales to treat runoff from parking lots and other hardscape areas;
- Waste management and recycling;
- Use of recycled materials where feasible; and
- Other sustainable technologies or practices that become feasible or required by the time the system is in final design.

The Proposed Project also will consider incorporating the following sustainable features:

- Electric car charging ports;
- Photovoltaics to generate electricity and reduce reliance on the power grid;
- Lighter color aggregate for parking lots and other paved surfaces to reduce the heat island effect;
- Other cool pavement technologies where feasible; and
- Make sustainable methods visible using signage as an educational tool.

2.5 PROJECTED RIDERSHIP

Assuming that Caltrans completes its widening of SR 4 on schedule, the Proposed Project is expected to open for service in the year 2015. By the year 2030, the Proposed Project from Pittsburg/Bay Point BART Station to Hillcrest Avenue is expected to attract 10,100 daily, one-way passenger trips (entrances and exits). Of these trips, 5,400 would be made by new transit riders. Changes in regional travel patterns that would result from the Proposed Project were estimated from travel demand models. The travel demand models were based on a modified regional travel model developed by the Metropolitan Transportation Commission (MTC) and the CCTA, in conjunction with BART. Estimated ridership for the Proposed Project is derived from model outputs and is presented in Table 2-1. A more detailed description of the ridership modeling is provided in Section 3.2, Transportation, of this Draft EIR.

Table 2-1
Projected Daily DMU Ridership, 2015 and 2030

Year	Weekday eBART Trips	Trips by New Transit Riders ^a
2015	3,900	2,050
2030	10,100	5,400

Source: Wilbur Smith Associates, 2008.

Note:

- a. New transit riders are those who were not previous BART or Tri Delta Transit users in the SR 4 corridor.

2.6 OPERATIONAL CHARACTERISTICS

Current BART Operating Plan

Current BART service to the Pittsburg/Bay Point BART Station is provided by the Concord Line, which operates between San Francisco International Airport (SFO) and the Pittsburg/Bay Point BART Station. Concord Line trains operate every 15 minutes for 20 hours on weekdays, every 20 minutes from 6:00 a.m. to 6:30 p.m. and every 15 minutes from 6:30 p.m. to midnight on Saturdays, and every 15 minutes for 16 hours on Sundays. Service to Pittsburg/Bay Point BART Station operates during the following hours:

- Weekdays: 4:00 a.m. to Midnight
- Saturdays: 6:00 a.m. to Midnight
- Sunday/Holidays: 8:00 a.m. to Midnight

Proposed DMU Operating Plan

The operating plan for the Proposed Project would consist of one route with the same hours of operation as the current BART service. The DMU project headways would mirror those of the BART system, with the DMU capable of providing service every 15 minutes throughout the daytime hours and during the early mornings, evenings, and weekends. The proposed operating plan assumes one operating service scenario beginning opening day, which would be adjusted to serve demand. For this plan, the Proposed Project would involve the employment of 40 to 80 full-time equivalent staff for the administration, operation, and maintenance of the DMU service.

The proposed operating plan for DMU service from the Pittsburg/Bay Point BART transfer platform to the Hillcrest Avenue Station is shown in Table 2-2.

Table 2-2
Proposed Project Operating Schedule for DMU Service

Project	Weekday	Saturday	Sunday/Holiday
Hours of Operation	4:00 a.m. to 12:00 a.m.	6:00 a.m. to 12:00 a.m.	8:00 a.m. to 12:00 a.m.
Headway (minutes)	15	15-20	15

Sources: BART and Wilbur Smith Associates, 2008.

Note:

Initial train operation would not exceed two cars.

Fleet Size and Vehicles. During the peak periods, two-car DMU trains would be operated on 15-minute headways. Three two-car trains would be required to provide the service, for a total of six DMU vehicles. Two spare vehicles would also be needed, bringing the total fleet to eight vehicles.

Travel Times. The DMU running time would be 13 minutes from the Pittsburg/Bay Point BART transfer platform to the Hillcrest Avenue Station including a three-minute transfer period at the transfer platform. It also includes a one-minute stop at the Railroad Avenue Station.

Fares and Collection. Fares for the Proposed Project would be consistent with BART's current distance-based fare policy. Advanced fare collection techniques would be employed that are similar to the Translink fare system that is currently under development and would allow a single fare collection system to be used for the combined BART and DMU system. Fare collection on the Proposed Project would be much like the BART smart card system. Rather than a paper ticket, the BART smart card system allows passengers to touch their rider card to the top of the fare gate to "tag on/tag off" as they enter or leave the system. BART-specific or regional stored-value fare cards also could be purchased in advance or from ticket

machines on the platform. Access to the vehicles would be unimpeded by platform pay gates or on-train fare collection.

Interface with Existing Transit Services. Tri Delta Transit would provide local transit connections to the DMU stations. These connections would require a reconfiguration of the existing Tri Delta Transit route system. The changes to the system would involve the elimination of routes that would duplicate the proposed service and initiation of new bus service to the DMU stations.

Bus routes that currently run along SR 4 from the Pittsburg/Bay Point BART Station to the Antioch/Hillcrest Park-and-Ride Lot would be targeted for replacement by the DMU service. These include Tri Delta Transit Routes 200, 300, 391, and 393.

Feeder bus service to Pittsburg/Bay Point BART Station, and the proposed stations at Railroad Avenue and Hillcrest Avenue include the following Tri Delta Transit routes: 201, 380, 383, 384, 385, 387, 388, 389, 390, 392, and 394.

Project Timing and Schedule. The Proposed Project is expected to begin construction in 2009. Construction would continue in phases until 2015. The first year of eBART operation is expected to be 2015. However, construction of the Proposed Project is predicated on Caltrans widening the median of SR 4 to a point east of Hillcrest Avenue. Any delay in the highway widening will also delay completion of the Proposed Project.

2.7 PROJECT COSTS AND FUNDING

The estimated costs of the Proposed Project and station options are summarized below. Cost estimates were based on the Preliminary Engineering for the Proposed Project. These estimates are presented in 2009 dollars.

Capital Costs

Proposed Project. The total estimated capital cost for the Proposed Project is approximately \$486 million (2009 dollars). Escalated to the midpoint of construction, the cost to construct would be \$509 million. The estimated capital costs of the Proposed Project are summarized in Table 2-3. The table groups the costs into several categories: Environmental Review and Preliminary Engineering, Project Components, Project Contingency, and Caltrans/CCTA costs to accommodate eBART in the median.

**Table 2-3
Proposed Project – Estimated Capital Costs (2009 Dollars)^a**

Line Item Description	DMU Project Cost (\$Million)	Project Components Funded by Others ^b	
		Component	Cost (\$Millions)
Preliminary Engineering and Environmental Review	\$26	--	--
Project Components		--	--
Transfer Platform	37	--	--
Railroad Avenue Station	--	Station	22
Hillcrest Avenue Station (median)	24	Parking/Access	24
Guideway & Systems	152	--	--
Aerial Structures	27	--	--
Vehicles (8)	65	--	--
<i>Subtotal</i>	\$305		
Subtotal	\$331		
Project Contingency	30		
Project Subtotal	\$361		
Caltrans/CCTA Additional Cost to Accommodate eBART in Median ^c	125		
TOTAL PROJECT COST^d	\$486		

Source: BART, 2008.

Notes:

- Estimates based on preliminary engineering.
- Pittsburg has agreed to fund the Railroad Avenue Station. Antioch has agreed to work with BART and others to secure funding for Hillcrest Station-related parking and access.
- Cost for widened median and construction of median barrier.
- When costs are escalated to the midpoint of construction, project cost would escalate to an estimated \$509 million.

Operating and Maintenance Costs

Proposed Project. Annual operating costs for the DMU system are estimated to be \$8.3 million (2009 dollars). The operating and maintenance costs are based upon the service and fleet assumptions described above in Section 2.6.

Station Location Options. Construction of the station at optional locations would cost more than the Proposed Project based on a variety of factors, including increased track length, tunnels required to exit the median, and additional acreage required to accommodate maintenance activities outside the median. Table 2-4 illustrates the estimated cost to construct a DMU to the three station options compared to the Proposed Project. The cost to construct the DMU to the Northside West Station option would be approximately \$548 million dollars (an additional \$62 million); to the Northside East Station option approximately \$568 million (an

additional \$82 million); and to the Median Station East option approximately \$530 million (an additional \$44 million).

Table 2-4
Hillcrest Avenue Station Options – Estimated Capital Costs

Station Options	Station Option Cost (\$Million)	Additional Cost Compared to the Proposed Project (\$Million)
Proposed Project (Median Station)	486	--
Northside West Station	548	62
Northside East	568	82
Median Station East	530	44

Source: BART, 2008.

The operating and costs for the optional station locations are slightly higher than the Proposed Project based on costs to maintain the additional length of track and tunnels. The operating cost for the Northside West Station would be approximately \$8.7 million annually; for the Northside East Station option, \$11.7 million annually; and for Median Station East option, \$8.7 million annually.

Project Funding

Project funding is provided by a combination of revenues from Contra Costa County's transportation sales tax (Measure J) and State and regional funds. These sources would fund the \$509 million escalated capital costs of the Proposed Project. As identified in MTC's Regional Transit Improvement Program, adopted as Resolution No. 3839, the Proposed Project's funding plan involves the sources listed in Table 2-5. The largest single source of funding comes from the CCTA Measure J funds, which would provide approximately \$175 million to the Proposed Project, net of program and finance costs as reflected in the Measure J Strategic Plan. The costs for any additional phases of the project are not included in the funding plan.

The Proposed Project currently has approximately \$502 million in secured project funding. Figure 2-15 presents a chart illustrating the distribution of funding sources for the Proposed Project.

The funding sources and amounts available for the Proposed Project are identified below.

- **Regional Measure 1, \$52M** — In November 1988, Bay Area voters approved Regional Measure 1 (RM 1), which authorized a standard auto toll of \$1 for all seven state-owned Bay Area toll bridges. The revenues generated by the toll increase were identified for use for certain highway and bridge improvements, public transit rail extensions, and other projects that reduce congestion in the bridge corridors.

**Table 2-5
Proposed Project Funding Plan (2009 Dollars)**

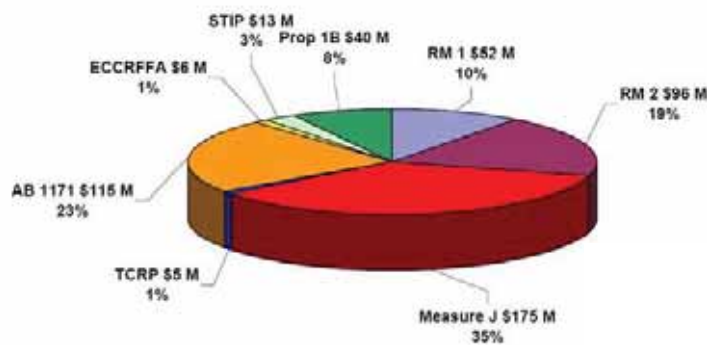
Fund Sources	\$Million
Secured Funding	
Regional Measure 1	\$52
Regional Measure 2	96
Measure J ^a	175
Traffic Congestion Relief Program	5
Proposition 1B	34
AB 1171	115
State Transportation Improvement Program	13
Subtotal	\$490
Funding Committed, Timing Uncertain	
East Contra Costa Regional Fee and Finance Authority ^b	6
Proposition 1B ^c	6
Subtotal	\$12
TOTAL	\$502

Source BART, 2007.

Notes:

- a. The Measure J Strategic Plan includes a third bond issuance of approximately \$135.6 million in FY2015, dedicated exclusively to eBART.
- b. Request for \$12 million made July 2006, pending approval.
- c. \$6 million from State Transit Assistance Spillover Account at a future date.

Figure 2-15 Proposed Project Funding Plan — \$502 Million



Source: BART, 2008.

RM 1	Regional Measure 1 (Bridge Tolls)
RM 2	Regional Measure 2 (Bridge Tolls)
AB 1171	Assembly Bill 1171 (Bridge Tolls)
Prop 1B	Proposition 1B (State Funds)
STIP	State Transportation Improvement Program (State Funds)
TCRP	Traffic Congestion Relief Program (State Funds)
Measure J	Measure J (Regional)
ECCRFFA	East Contra Costa Regional Fee and Financing Authority (Regional)

- **Regional Measure 2, \$96M** — In March 2004, voters passed Regional Measure 2 (RM2), raising the toll on the seven state-owned toll bridges in the San Francisco Bay Area by \$1.00. This extra dollar funds various transportation projects within the region that have been determined to reduce congestion or to make improvements to travel in the toll bridge corridors. Specifically, RM2 establishes the Regional Traffic Relief Plan and identifies specific transit operating assistance and capital projects and programs eligible to receive RM2 funding.
- **Measure J, \$175M** — In November 2004, 70.5 percent of Contra Costa voters approved the continuation of the county's half-cent transportation sales tax (Measure J) for 25 more years. Projects specifically highlighted in the Measure J language include the State Route 4 East Widening and East Contra Costa BART Extension.
- **TCRP, \$5M** — The Traffic Congestion Relief Program was signed into law by then-Governor Gray Davis in July 2000 under Assembly Bill 2928. This program authorized \$4.9 billion through 2006 for complete or partial funding of 141 projects statewide that were intended to relieve congestion, provide safe and efficient movement of goods and provide connections between various modes of travel. In March 2002, California voters adopted Proposition 42, which took effect in July 2003. This proposition designated state sales tax on gasoline to transportation, rather than the state general fund. Proposition 42 honored the TCRP projects by giving them “first call” on the funds through 2008. Derived from Proposition 42, TCRP funding was partially suspended in FY 2003-04 and fully suspended in FY 2004-05 in response to the fiscal crisis experienced by the State at that time. However, TCRP/Proposition 42 funds were included in the 2005-06 State Budget.
- **Proposition 1B, \$40M** — The Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, approved by the voters as Proposition 1B in November 2006, includes a program of funding from \$4.5 billion to be deposited in the Corridor Mobility Improvement Account (CMIA). The funds in the CMIA are to be used for performance improvements on the state highway system or major access routes to the state highway system. Proposition 1B has provided \$34 million in funding with an additional \$6 million to be provided from the State Transit Assistance Spillover Account at a future date.
- **AB 1171, \$115M** — In 2001, the Legislature repealed the 2008 sunset date for the \$1 toll surcharge on the State's Bay Area toll bridges. Instead, the surcharge will be extended for up to 30 additional years. This surcharge is now expected to provide a total of \$2.3 billion.
- **STIP, \$13M** — The State Transportation Improvement Program (STIP) is a multi-year capital improvement program of transportation projects on and off the State Highway System, funded with revenues from the State Highway Account and other funding sources. STIP programming generally occurs every two years.

- **ECCRFFA, \$6M** — The East Contra Costa Regional Fee and Financing Authority was formed in 1994 as a joint exercise of powers agency and includes the Cities of Antioch, Brentwood, Oakley and Pittsburg, and the County of Contra Costa. A transportation mitigation fee program was established at this time and fee ordinances adopted by each jurisdiction. This transportation fee program funds three regional projects in eastern Contra Costa County: the Buchanan Road Bypass, State Route 4 East improvements, and the State Route 4 Bypass project.

2.8 CONSTRUCTION SCENARIO

Introduction

This construction scenario describes the locations of the construction activities, the proposed construction methods and equipment, and the schedule and sequencing of construction. Street/lane closures, construction staging areas, and haul routes are also discussed.

The major construction activities associated with the Proposed Project include the following elements (also see Table 2-3):

- Transfer platform east of the existing Pittsburg/Bay Point BART Station and reconfigured tailtracks;
- Bridges where guideway crosses over roads;
- Guideway in the SR 4 median, including installation of double tracks and signaling elements;
- Two new stations at Railroad Avenue and Hillcrest Avenue;
- Station support facilities, including parking lots;
- DMU vehicle maintenance and storage facilities; and
- Utility relocation and installation.

Construction Phases and Duration

Construction of the Proposed Project would be completed in stages, beginning at the existing Pittsburg/Bay Point BART Station. Work would proceed eastward, with the majority of construction occurring within the SR 4 median. Construction would take place in two phases, Phase 1A and Phase 1B. Phase 1A is the segment between the Pittsburg/Bay Point BART Station and Loveridge Road. The median in this segment has already been widened by Caltrans. Construction of the transfer platform, Railroad Avenue Station, and a portion of the guideway would take place in Phase 1A and would take approximately 24 months. Table 2-6 identifies the phases, locations, and anticipated schedule for construction.

Table 2-6
Proposed Project Construction Phasing and Schedule

Phase	Location	Start Date	Duration	End Date
1A	Pittsburg/Bay Point BART Station to Loveridge Road	2009	24 months	2011
1B	Loveridge Road to Hillcrest Avenue	2013	24 months	Late 2014

Source: BART, 2008, PGH Wong Engineering, *East Contra Costa County Transit Project (eBART) – Construction Implementation Report, Preliminary Engineering*, November 30, 2007.

Phase 1B is the segment between Loveridge Road and Hillcrest Avenue. It would include construction of the eastern portion of the guideway and Hillcrest Avenue Station. Construction of Phase 1B would also last approximately 24 months. Caltrans would need to widen the median in Segment 1B before construction for DMU can commence. This time schedule is consistent with, and based on, the Caltrans timeframe for construction of the planned SR 4 widening and median improvements.

Coordination with Caltrans

Caltrans is planning to widen SR 4 from approximately the Loveridge Road interchange east to the SR 160 flyover. Certain elements within this segment will be constructed to accommodate potential future transit. These elements include the bridge abutments and footings for roadway crossings, barriers, and retaining walls between highway lanes and the median that is being preserved for future transit use. Also, drainage facilities for future transit will be designed to tie into inlets that discharge into cross drains that are part of the freeway facilities. These elements are components of the Caltrans project, which are designed to accommodate any form of future transit in the widened highway median, including but not limited to the Proposed Project. Incorporating these elements in the highway widening project will help ensure that the highway design and construction do not preclude a future extension of transit in the median, even if the Proposed Project is not adopted.

In the interest of overall efficiency and reducing construction impacts along SR 4, and if the timing is appropriate, Caltrans has expressed willingness to construct project-related improvements during the median widening. This would keep project costs lower than they would be otherwise and minimize the duration of potential construction impacts to both local residents and the traveling public.

Throughout construction, primary access to the median work areas and median station sites would be through interior SR 4 east and westbound traffic lanes. Temporary openings would be constructed in the existing concrete barriers to allow vehicle and equipment access. These openings, wherever they are necessary, would be subject to the direct authorization from Caltrans for configuration and traffic safety. In work areas that do not have existing barriers,

construction areas would be separated from the vehicular traffic on SR 4 by K-rail barriers.⁴ Vehicle and pedestrian movement on overpasses (for example, Railroad Avenue) could be delayed during certain construction activities. These construction operations are subject to the authorized configurations and traffic safety requirements of Caltrans and the local jurisdictions (such as the cities of Pittsburg and Antioch).

Construction of Project Components

Transfer Platform and Ancillary Structures. Construction of the transfer platform is planned to allow the Pittsburg/Bay Point BART Station to operate without interruption of service. Storage of BART vehicles now on the tailtracks east of the station would be diverted to the Concord Maintenance Yard and other locations. During construction of the transfer platform and ancillary buildings, a barrier would be constructed along the east side of the Pittsburg/Bay Point BART Station to segregate BART operations from DMU construction activities.

Construction of the transfer platform and ancillary structures would involve cast-in-place concrete⁵ to construct a slightly elevated platform. The platform and building would be constructed of standard building materials such as concrete, steel, aluminum, and heavy plastic. Steel-wheeled or rubber-tired compactors, graders, and small bulldozers would be required for subgrade preparation below the platform and adjacent trackbed. Construction of the station platform would require trucks to remove excavated soil and deliver transit-mix concrete and concrete pumps, and trucks to deliver forms, reinforcing steel, and other materials.

Guideway. Guideway construction would proceed eastward from the Pittsburg/Bay Point Station and transfer platform to the Hillcrest Avenue Station. Caltrans previously has constructed the westerly portions of the median with BART standard barrier walls and underdrains⁶ for transit extension. Therefore, new construction would generally consist of minor grading for the guideway, track installation, and in those areas where median improvement would be required, barriers, grading, and installation of a sub-terrain drainage system. Buried ductbank for electrical, communication, and train controls would be installed. The barriers would be constructed using cast-in-place concrete to build 3-foot-high traffic barriers and top-mounted security fencing.

General construction of the guideway would begin with the removal of any existing tailtracks and existing ballast. Earth removal equipment would then be used to grade the median to allow

⁴ A K-rail traffic barrier is a standard 3-foot-tall concrete barrier that can be used as a temporary traffic barrier during construction.

⁵ Cast-in-place concrete is transported in an unhardened state, commonly referred to as ready-mix cement. The concrete is then poured into wooden “forms” and allowed to cure on site.

⁶ An underdrain is an underground drain or trench with openings through which the water may percolate from the ground above. An underdrain would be constructed along the entire median to allow complete drainage of the guideway and tracks.

track placement. Track construction would generally consist of sub-ballast and ballast.⁷ Rails and ties would be imported by truck and placed with specialized equipment.

Railroad Avenue Station. The Railroad Avenue Station would be constructed in the median of SR 4 beneath the Railroad Avenue overpass. Construction and materials of the Railroad Avenue Station would be similar to the construction of the transfer platform, involving cast-in-place concrete. Construction would occur along the Railroad Avenue overpass to provide stair and elevator access to the station.

Overpasses and Aerial Guideways. Six aerial overpass spans would be constructed in the Loveridge Road to Hillcrest segment of the project, as identified in Table 2-7.

Table 2-7
Overpasses Required for the Proposed Project

Location	Span Length
Century Boulevard	90 feet/single span
Utility Corridor ROW	80 feet/single span
Somersville Road	115 feet/double span
L Street	65 feet/double span
A Street	80 feet/double span
Cavallo Road	117 feet/single span

Source: PGH Wong Engineering, *East Contra Costa County Transit Project (eBART) – Construction Implementation Report, Preliminary Engineering*, November 30, 2007.

Aerial guideways and structures are generally constructed in four stages. The first stage involves the installation of piles⁸ that would support the weight of the structure and the loads it would carry. These piles are generally long steel or concrete poles that are driven into the ground by pile driving equipment unless cast-in-drilled-hole⁹ piles are possible. The second stage is the pile cap, which joins all the piles and is constructed of reinforced concrete and is approximately 4 to 5 feet thick. The third stage involves the construction of the columns, which are typically constructed of reinforced concrete poured inside a reusable steel form. A circular column approximately 5 feet in diameter is generally used. The fourth and final stage of construction involves the placement of the girders.¹⁰ The placement of the girders can begin after the column concrete has cured for a sufficient time, typically 14 days.

⁷ Ballast and sub-ballast refer to the crushed angular rocks that are packed below, between, and around rail ties. The use of ballast facilitates drainage as well as bearing the weight of the trains.

⁸ Piles are deep foundations typically used to support large structures.

⁹ Involves digging a deep hole (shaft), placing the pile into the hole, and then filling the remainder with concrete.

¹⁰ A girder is the main horizontal support of a structure that supports the structure's surface and vehicle loads.

Cast-in-place concrete bridges require the erection of formwork to support the concrete while it cures. Depending on the length of the spans, forms can be several feet deep. Bridges spanning roadways must be designed with sufficient clearance. However, it might be necessary to reduce clearance during construction. In this case, over-height vehicles would need to be detoured.

Hillcrest Avenue Station. The station platform would be located within the SR 4 median east of the Hillcrest Avenue overpass. The station would be a median station platform linked to the north side of SR 4 by an elevated pedestrian bridge over the westbound lanes of SR 4. The DMU platform would be a cast-in-place concrete structure constructed in a manner similar to the transfer platform and Railroad Avenue Station. The bridge concourse, which would provide a minimum of 15.5 feet in clearance over westbound SR 4, would be constructed in a manner similar to the aerial bridge structures for the guideway described above.

A tunnel under the westbound SR 4 lanes would provide the maintenance right-of-way to connect the maintenance facility to the maintenance annex north of SR 4. Construction of the tunnel would utilize cut and cover techniques. With cut and cover construction, a trench is excavated, forms are built in the trench, concrete is placed (cast) into the forms, and after the concrete has cured, the forms are removed. The excavation is then filled, the earth compacted, and the roadway reinstalled. During construction, a shoring system would support the sides of the excavation to prevent soil from shifting, protecting workers and ensuring public safety.

Out-of-Median Station Options. Station construction for the Northside West and Northside East Station options would be similar to that for the other station sites: cast-in-place concrete to construct a slightly elevated platform along with stairs; and standard building materials such as concrete, steel, aluminum, and heavy plastic for the station facilities. Construction of the maintenance facilities would utilize similar equipment and processes as described previously.

The Northside West and Northside East Station options, which are located approximately 450 feet north of SR 4 adjacent to the UP ROW, would be connected to the SR 4 median guideway via a tunnel beneath the westbound lanes of SR 4. The construction techniques for the tunnel would be identical to those described above for the maintenance right-of-way. Compared to the Proposed Project, tunnel construction for both the Northside West and Northside East Station options would involve greater excavation and the truck trips related to excavation unless the spoils material was used on-site. Construction of the Northside East Station would involve greater site grading than the other station options because the steep slopes south of the Northside East Station site would need to be leveled to provide parking for this station option.

Median East Option. The Median Station East option would locate the station within the SR 4 median, east of the Median Station. The DMU platform for this option would be constructed in the same manner as the Median Station of the Proposed Project. The maintenance facility would be out of the SR 4 median, north of SR 4. The out-of-the-median maintenance facility

would be connected to the station via a tunnel beneath SR 4. Construction of the tunnel would be the same as described above for the maintenance right-of-way under the Proposed Project.

Potential Staging Areas. Four temporary construction yards and staging areas have been identified that might be used during project construction. The location of staging areas is considered to be somewhat speculative, because the construction contractor would most likely have the option of choosing sites other than the potential sites identified in this EIR. The potential construction yards are located in close proximity to the corridor and would store construction equipment, temporary offices, and other construction-related materials, such as fuel. Two potential staging areas are at the western end of the project corridor, one in the middle, and one at the eastern end. The following four locations are being considered for staging areas:

- South of SR 4 adjacent to the east side of the Pittsburg/Bay Point BART Station parking lot on a site that is currently vacant.
- North of SR 4, between Franklin Avenue and Emerald Cove, on currently vacant land approximately 3,000 feet east of the Bailey Road overpass.
- South of SR 4 between Railroad Avenue and Harbor Street at the northwest corner of Bliss Avenue and Harbor Street on a vacant lot owned by CCTA.
- North of SR 4 and east of Hillcrest Avenue on currently vacant land in the vicinity of the existing BART park-and-ride facility.

The yards would be surfaced with gravel to allow for vehicle and equipment use. These yards would contain temporary buildings and security lighting, all within secured areas. Drainage and erosion control plans for the yards would be implemented and maintained throughout the construction process.

Equipment and Materials. Equipment for construction of the stations and guideway would include dump trucks, self propelled earth-scrapers, water trucks, bulldozers, grade-alls, truck-mounted cranes, loaders, excavators, rollers, concrete ready-mix trucks, lubrication/fueling service trucks, concrete pumps, and diesel-driven generators and compressed air units for construction power, equipment, and tools.

Additional equipment required for the aerial guideway construction could include drilling rigs, pile drivers, trucks to remove excavated soil, specialized truck trailers to deliver pre-cast concrete beams, cranes, trucks to deliver forms, reinforcing steel, pavement saws, pre-cast concrete post tensioning jacks, and related equipment. Specialized equipment for tunnel construction would include possible water jet excavators and large excavators.

The materials needed for construction of the Proposed Project are identified in Table 2-8. Construction of the DMU transfer platform would require approximately 16,000 cubic yards (CY) (1,140 truck loads) of imported sub-ballast and 1,800 CY (200 truck loads) of structural cast-in-place concrete. Construction of the guideway in the section of the project corridor from

the Pittsburg/Bay Point BART Station to the east side of Loveridge Road would require approximately 88,000 CY of imported sub-ballast and ballast material, which would require 6,200 truck loads. Concrete ties and 80-foot-long rails would be delivered to the median for tie placement and welding of the continuous rail installation. The Railroad Avenue Station would require approximately 700 CY of cast-in-place (80 truck loads).

Table 2-8
Estimated Amount of Construction Materials

Proposed Project Facility	Estimated Amount of Materials
DMU Transfer Platform	16,000 CY/1,140 truckloads of sub-ballast 1,800 CY/200 truckloads of cast-in-place concrete
Guideway from DMU Transfer Platform to Loveridge Road	88,000 CY/6,200 truckloads of ballast and sub-ballast Concrete ties and 80-foot rail lines
Railroad Avenue Station	700 CY/80 truckloads of cast-in-place concrete
Roadbed, Guideway & Systems in SR4 Median from the Loveridge Interchange to the Somersville Road Interchange	83,000 CY/6,000 truckloads of ballast and sub-ballast. Concrete ties and 80-foot rail lines.
Aerial Structures, Roadbed & Guideway in SR 4 Median from the Somersville Road Interchange to the Hillcrest Avenue Station site	100,000 CY/7,200 truckloads of ballast and sub-ballast. 1,800 CY/200 truckloads of cast-in-place concrete.

Source: PGH Wong Engineering, 2008.

Construction of the guideway from east of Loveridge Road to the Somersville Road interchange would require approximately 83,000 CY of imported sub-ballast and ballast material, which would require 6,000 truck loads. Concrete ties and rails would also be needed.

The final segment from the Somersville Road interchange to the Hillcrest Avenue terminus would involve the heaviest materials requirement for the corridor. About 100,000 CY of imported sub-ballast and ballast material (7,200 truck loads) and 1,800 CY of cast-in-place concrete (200 truck loads) are anticipated.

Traffic Delays. To reduce construction impacts on the traffic and service along SR 4, major material deliveries and heavy equipment use would be coordinated with Caltrans. However, the contractor would develop a traffic mitigation plan that would address lane closures for delivery and equipment access. Vehicle and pedestrian movement on the Railroad Avenue overpass could be delayed during the construction of the Railroad Avenue Station. Lane closures would be expected along portions of Hillcrest Avenue, as this would be the likely source for new water and sewer service utilities to serve the maintenance yard and future Hillcrest Avenue Station. Other detours/delays could be expected along segments of SR 4 as well as along the cross streets where aerial structures would be constructed. While designated

haul routes have not been determined, roadways that reduce residential impacts would be used to the fullest extent feasible. These operations are subject to the authorized configurations and traffic safety requirements of Caltrans and the cities of Pittsburg and Antioch.

Utility Relocation/Potential Service Disruptions. No major utility relocation would occur during this Phase 1A of the project. Temporary utilities for electricity, sewer, and water would be provided to the equipment maintenance yards and staging areas during the construction phases. Permanent connections for power, potable water, water for fire suppression, and possibly sanitary sewer are needed at both the DMU transfer platform and Railroad Avenue Station.

For all Hillcrest Avenue Station options, proposed for Phase 1B of this project, new utility infrastructure, including water, power, communication, and sewer utilities, would be required. Further, the existing storm drainage system along Hillcrest Avenue may also require modifications to serve drainage needs for the station and parking lot.