SUMMARY

A. EIR OVERVIEW

The San Francisco Bay Area Transit District (BART) is proposing the BART to Livermore Extension Project, which is being evaluated in this Draft Environmental Impact Report (EIR). The Proposed Project, which is also referred to as the Conventional BART Project, would extend transit service 5.5 miles east into eastern Alameda County from the existing Dublin/Pleasanton BART Station (Dublin/Pleasanton Station) within and adjacent to the Interstate (I-) 580 right-of-way (ROW), through the cities of Dublin and Pleasanton, to a proposed new terminus station located at the Isabel Avenue/I-580 interchange in the city of Livermore (referred to herein as Isabel Station). In addition, a new parking facility would be constructed at the new Isabel Station and a new BART storage and maintenance facility would be constructed beyond the Isabel Station, north of I-580. The Proposed Project includes new and modified bus routes, connecting the new Isabel Station to downtown Livermore, Lawrence Livermore National Laboratory (LLNL), the Vasco Road Altamont Corridor Express (ACE) station, and other areas east of the BART system. The overall performance of these bus routes would be improved via the implementation of transit priority infrastructure enhancements.

In compliance with the California Environmental Quality Act (CEQA), this Draft EIR describes the potential environmental effects of the Proposed Project, as well as mitigation measures and alternatives that would avoid or reduce significant adverse environmental impacts. This Draft EIR evaluates the potential impacts of the Proposed Project and three Build Alternatives—the Diesel Multiple Unit (DMU) Alternative (which includes a variant referred to as the Electrical Multiple Unit [EMU] Option), the Express Bus/Bus Rapid Transit (BRT) Alternative, and the Enhanced Bus Alternative. The three Build Alternatives were identified in initial screening as alternatives which potentially could meet most of the project objectives and be completed within a reasonable timeframe, and therefore merited full evaluation in this EIR. In addition, the No Project Alternative (or No Build Alternative) is evaluated.

B. BACKGROUND

In November 2009, BART released the Draft Program Environmental Impact Report (PEIR) for the BART to Livermore Extension Program (State Clearinghouse No. 2008062026). The Draft PEIR considered nine alignment alternatives for extending the existing BART service eastward from the Dublin/Pleasanton BART Station (Dublin/Pleasanton Station) to Livermore. BART released a Final PEIR in June 2010. The Final PEIR included an additional

alignment alternative to Downtown Livermore, referred to as Alternative 2B (Portola-Vasco), which combined features of several of the alternatives studied in the Draft PEIR. On July 1, 2010, the BART Board of Directors certified the Final PEIR and selected Alternative 2B (Portola-Vasco) as the preferred alternative.

Initially, the City of Livermore recommended the Alternative 2B (Portola-Vasco) alignment; however, following further public discussion, the City determined that it preferred an alignment along I-580 from Dublin/Pleasanton Station to Greenville Road, with stations at Isabel Avenue and Greenville Road. This alignment was then incorporated into the City of Livermore's General Plan.

This Draft EIR serves as a second tier, project-level EIR for the BART to Livermore Extension Project, pursuant to CEQA. The Proposed Project in this Draft EIR would extend BART service approximately 5.5 miles east from the Dublin/Pleasanton Station to a new station in the I-580 median at Isabel Avenue in Livermore. The Proposed Project's alignment corresponds to: (1) the alignment of Alternative 4 (Isabel Avenue/I-580 interchange) in the PEIR; (2) portions of the alignment of Alternative 2B (Portola-Vasco), which was selected by the BART Board of Directors; and (3) the City of Livermore's preferred alignment within the I-580 median.

C. PROJECT OBJECTIVES

The Tri-Valley Area has been one of the fastest growing subregions of the San Francisco Bay Area (Bay Area). As a result, travel demand in the region has continued to increase, and gridlock occurs regularly on I-580 in the Tri-Valley Area.

The proposed 5.5-mile BART extension from the Dublin/Pleasanton Station to a new station at Isabel Avenue in Livermore would improve the regional transit network by enhancing the link between Livermore and the greater Bay Area. By shortening travel times and improving reliability, the BART extension would generate additional transit ridership and provide an alternative to traffic congestion. The BART to Livermore Extension Project would help accommodate projected future growth in employment and population, reduce pressure to expand roads, and support the region's efforts to meet State of California (State) greenhouse gas reduction goals.

Given the transportation characteristics and future travel demand in east Alameda County and along the I-580 corridor in particular, the following objectives have been identified by BART for extension of transit service to Livermore:

- Provide a cost-effective intermodal link of the existing BART system to the inter-regional rail network and a series of Priority Development Areas (PDAs) identified by the City of Livermore, the Metropolitan Transportation Commission, and the Association of Bay Area

Governments. These PDAs include the Livermore Isabel Avenue BART Station PDA, the Livermore Downtown PDA, and the Livermore East Side PDA.

- Support the regional goals of integrating transit and land use policies to create opportunities for transit-oriented development in PDAs in the Livermore area.
- Provide an effective commute alternative to traffic congestion on I-580.
- Improve air quality and reduce greenhouse gas (GHG) and other emissions associated with automobile use.

D. SUMMARY OF PROPOSED PROJECT AND ALTERNATIVES

This subsection describes the proposed BART to Livermore Extension Project that is evaluated in this Draft EIR. The Proposed Project, which is also referred to as the Conventional BART Project, involves extending the BART system, using conventional BART technology, from the existing terminus of the Daly City-Dublin/Pleasanton Line at the Dublin/Pleasanton Station to a new station located east of Isabel Avenue (State Route 84) in the city of Livermore.

In addition to the Proposed Project, three Build Alternatives, as well as the No Project Alternative (or No Build Alternative), are evaluated in this EIR. The Build Alternatives were identified in initial screening as alternatives with the potential to meet most of the project objectives and be completed within a reasonable timeframe; therefore, they merited full evaluation in this EIR. The three Build Alternatives are as follows:

- DMU Alternative, which includes a variant referred to as the EMU Option
- Express Bus/BRT Alternative
- Enhanced Bus Alternative

The Proposed Project and Build Alternatives are described below and summarized in Table S-1.

1. No Project Alternative

The No Project Alternative describes the consequences if the BART Board decides not to proceed with either the Proposed Project or any of the Build Alternatives. For this EIR, the No Project Alternative represents the region's existing transportation network—consisting of highways, arterial roads, public transit, and bicycle and pedestrian facilities—inclusive of planned improvements through 2040. In addition, the No Project Alternative acknowledges the expected population and employment growth in the nine-county Bay Area region through 2040. This alternative does not include the extension of rail or transit services beyond the improvements currently planned for implementation.

TABLE S-1 KEY COMPONENTS OF THE PROPOSED PROJECT AND BUILD ALTERNATIVES

	Conventional BART Project	DMU Alternative (With EMU Option)	Express Bus/ BRT Alternative	Enhanced Bus Alternative
Components of Proposed Project and Build Alternatives				
		BART/Rail Facilities		
Rail Service Extension	▪ Extend service 5.5 miles east to Isabel Avenue in I-580 median. ▪ Beyond Dublin/Pleasanton Station, convert 0.7 mile of existing tail tracks to mainline tracks, and extend track 4.8 miles to new station. ▪ Remove existing BART car storage in I-580 median and relocate to new storage and maintenance facility.	▪ Extend service 5.5 miles east to Isabel Avenue in I-580 median. ▪ Beyond Dublin/Pleasanton Station, existing BART tail tracks remain. ▪ Install DMU track 5.5 miles from Dublin/Pleasanton Station to new Isabel Station in I-580 median.	--	--
Dublin/Pleasanton Station	▪ No change.	▪ New DMU transfer platform on north side of the Dublin/Pleasanton Station. ▪ New 0.3-mile tail track for BART car storage west of station (storage for approximately 20 additional BART cars).	▪ New bus transfer platforms north and south of BART station platform. ▪ New direct bus-only ramps from I-580 express lanes to Dublin/Pleasanton Station. ▪ Extend tail track 0.1-mile east of station (storage for approximately 10 additional BART cars).	▪ No change.
Isabel Station	▪ BART platform in I-580 median, with pedestrian overcrossings to bus facility at Isabel North and station parking at Isabel South. ▪ New two-story end-of-line operations building (houses train supervisory booth and associated staff facilities).	▪ Similar to Proposed Project.	--	--

TABLE S-1 KEY COMPONENTS OF THE PROPOSED PROJECT AND BUILD ALTERNATIVES

	Conventional BART Project	DMU Alternative (With EMU Option)	Express Bus/ BRT Alternative	Enhanced Bus Alternative
Parking	▪ At Isabel Station, total of 3,412 parking spaces: 2,835 in a seven-level parking structure and 577 parking spaces in two surface parking lots.	▪ At Isabel Station, total of 2,428 parking spaces in a six-level parking structure.	▪ At Dublin/Pleasanton Station, relocate approximately 210 existing parking spaces to either (1) a surface lot adjacent to existing lot south of I-580; or (2) a three-level parking structure on the existing BART lot south of I-580. ▪ At Laughlin Road, new surface parking lot with approximately 230 parking spaces.	--
Storage and Maintenance Facility (for rail vehicles)	▪ Extend tail tracks 1.9 miles from Isabel Station to 68-acre storage and maintenance facility north of I-580. ▪ Capacity for storage of approximately 172 BART vehicles. ▪ Westbound I-580 underpass for tail tracks (from median to north of I-580). ▪ Bridges over Arroyo las Positas and Cayetano creeks and hillside tunnel for tail tracks.	▪ Extend tail tracks 1.8 miles from Isabel Station to 32-acre storage and maintenance facility north of I-580. ▪ Capacity for approximately 12 DMU vehicles (six married pairs). ▪ Westbound I-580 underpass for tail tracks (from median to north of I-580). ▪ Bridges over Arroyo las Positas and Cayetano creeks and hillside tunnel for tail tracks.	--	--
Wayside Facilities (power and communications support, such as power substations and switching stations)	▪ Wayside facilities along the project corridor at Croak Road and at Kitty Hawk Road/Isabel Avenue.	▪ Wayside facilities along the project corridor at Croak Road and at Kitty Hawk Road/Isabel Avenue.	--	--

TABLE S-1 KEY COMPONENTS OF THE PROPOSED PROJECT AND BUILD ALTERNATIVES

	Conventional BART Project	DMU Alternative (With EMU Option)	Express Bus/ BRT Alternative	Enhanced Bus Alternative
Additional BART Cars to Accommodate Increased Ridership	▪ 36 BART cars.	▪ 24 BART cars.	▪ 12 BART cars.	--
Caltrans Facilities and Surface Frontage Roads				
I-580 Relocation	▪ Modifications extend for 5.6 miles along I-580. Typical relocation by approximately 46 feet, from just east of Hacienda Drive interchange to west of Portola Avenue overcrossing. At the proposed Isabel Station, relocation by approximately 67 feet. ▪ Modifications at four interchanges: Tassajara Road/Santa Rita Road, Fallon Road/El Charro Road, Airway Boulevard, and Isabel Avenue. ▪ Modifications to surface frontage roads.	▪ Modifications extend for 7.1 miles along I-580. Typical relocation by approximately 46 feet, from west of Dougherty Road/Hopyard Road interchange to west of Portola Avenue overcrossing. West of Hacienda Drive interchange, on-ramp relocation up to approximately 140 feet. At the proposed Isabel Station, relocation by approximately 67 feet. ▪ Modifications at six interchanges: Dougherty Road/Hopyard Road, Hacienda Drive, Tassajara Road/Santa Rita Road, Fallon Road/El Charro Road, Airway Boulevard, and Isabel Avenue. ▪ Modifications to surface frontage roads.	▪ Modifications extend for 2.2 miles along I-580. Typical relocation by 88 feet from west of Dougherty Road to the Tassajara Road/Santa Rita Road overcrossing. At the Dublin/Pleasanton Station, relocation up to 100 feet. ▪ Modifications at three interchanges: Dougherty Road/Hopyard Road, Hacienda Drive, and Tassajara Road. ▪ Modifications to surface frontage roads in Dublin.	--

TABLE S-1 KEY COMPONENTS OF THE PROPOSED PROJECT AND BUILD ALTERNATIVES

	Conventional BART Project	DMU Alternative (With EMU Option)	Express Bus/ BRT Alternative	Enhanced Bus Alternative
		Bus Services		
Bus Routes[a, b]	▪ New/modified bus routes to Isabel Station instead of the Dublin/Pleasanton Station: LAVTA X-B, R-B, 12; RTD 150; and MAX BART Express. ▪ Eliminated routes: LAVTA 12X, 20X, and Rapid.	▪ Same as Proposed Project.	▪ Buses use direct ramps from I-580 express lanes to Dublin/Pleasanton Station. New/modified routes: LAVTA X-B, R-B, and 12. ▪ Eliminated routes: LAVTA 20X, and Rapid.	▪ Connections at Dublin/ Pleasanton Station same as existing conditions with new/modified routes: LAVTA X-A, R-B, and 12. Eliminated routes: LAVTA 20X, and Rapid.
		Bus Infrastructure		
Transit Signal Priority	▪ Installation of equipment at approximately two locations.	▪ Same as Proposed Project.	▪ Installation of equipment at approximately four locations.	▪ Installation of equipment at approximately six locations.
Improved Bus Shelters and Seating, Digital Messaging Boards, Pre-paid Ticketing.	▪ Installation at approximately 29 locations.	▪ Same as Proposed Project.	▪ Similar to Proposed Project.	▪ Similar to Proposed Project.
Bus Bulbs	▪ Installation of bus bulbs at approximately six locations.	▪ Same as Proposed Project.	▪ Installation of bus bulbs at approximately 10 locations.	▪ Similar to Express Bus/BRT Alternative.
Footprint [a]				
		Permanent		
Portion of Footprint Occupied by Existing Transportation Uses (Acres)	229	268	55	--[a]
Portion of Footprint within Parcels not Owned by BART (Acres) [Number of Parcels]	147 [117 parcels]	102 [137 parcels]	10 [34 parcels]	--[a]

TABLE S-1 KEY COMPONENTS OF THE PROPOSED PROJECT AND BUILD ALTERNATIVES

	Conventional BART Project	DMU Alternative (With EMU Option)	Express Bus/ BRT Alternative	Enhanced Bus Alternative
Portion of Footprint within BART-owned Parcels (Acres) [Number of Parcels]	35 [5 parcels]	35 [7 parcels]	12 [7 parcels]	-- [a]
Total Footprint – including I-580 (Acres)	**411**	**405**	**77**	-- [a]
		Temporary		
Construction Staging Areas (Acres)	29	32	6	-- [a]

Notes:
-- = Not applicable; LAVTA = Livermore-Amador Valley Transit Authority; MAX = Modesto Area Express; RTD = San Joaquin Regional Transit District; R-B = Rapid service; X-B = Express service (peak period); Caltrans = California Department of Transportation.
All units of measure are approximate, and distances are rounded to the nearest 0.1 mile.
A married pair is a set of two vehicles that are permanently coupled and treated as if they were a single unit.
[a] This EIR describes and analyzes the Enhanced Bus Alternative, as well as the feeder bus routes and bus infrastructure improvements associated with the feeder bus routes for the Proposed Project, DMU Alternative, and Express Bus/BRT Alternative, at a programmatic level. The bus routes are conceptual and were developed for the purpose of estimating BART ridership and operating costs. Candidate locations for bus infrastructure improvements, anticipated to be constructed within existing street rights-of-way, are described to document the availability of such locations. Following implementation of the adopted project, specific routes would be developed by the bus operators based on detailed service planning. At that time, the routes and bus infrastructure improvements could be subject to subsequent environmental review, if required.
[b] Several components of the proposed bus routes are similar to Wheels Forward, a program of changes to the LAVTA transit system implemented in August 2016 to provide more frequent buses and new routes in Livermore, Dublin, and Pleasanton. The new, modified, or eliminated routes under the Proposed Project and Build Alternatives are described in relation to the previous bus route network. Elements shared by the Proposed Project and Build Alternatives and the Wheels Forward program include improved bus service from Downtown Livermore to BART, improved bus service to Las Positas College, and improved bus shelters to serve the new Express and Rapid routes. Other capital improvements, such as real-time arrival message boards at bus stations, expansion of transit signal priority to additional intersections, and installation of bus bulbs, are not included in the Wheels Forward program. Additionally, the Proposed Project and Build Alternatives would include improved bus service to Lawrence Livermore National Laboratory and the east side of Livermore. Although LAVTA eliminated Route 12 and 12X service in August 2016, a restructured Rapid route serves most of the existing Route 12 stops on Dublin Boulevard, as well as North Canyons Parkway and Las Positas College, and a restructured Route 14 serves areas of Livermore previously served by Route 12. Therefore, these restructured routes would generally serve the areas previously served by the 12 and 12X, and the existing routes analyzed in this EIR remain as previously operated by LAVTA.
Sources: Arup and Anil Verma Associates, Inc., 2017; Arup, 2017a.

2. Conventional BART Project

The Conventional BART Project, shown in Figure S-1, involves extending the BART system using conventional BART technology, from the existing terminus of the Daly City-Dublin/Pleasanton Line at the Dublin/Pleasanton Station to a new station located at the Isabel Avenue/I-580 (State Route 84) interchange in the city of Livermore. The new alignment and the new Isabel BART Station (Isabel Station) would be constructed in the I-580 median. New parking facilities—consisting of a parking structure and a surface lot containing approximately 3,412 spaces—would be constructed immediately south of I-580 along East Airway Boulevard. In addition, a new, approximately 68-acre BART storage and maintenance facility would be constructed north of I-580, beyond the Isabel Station.

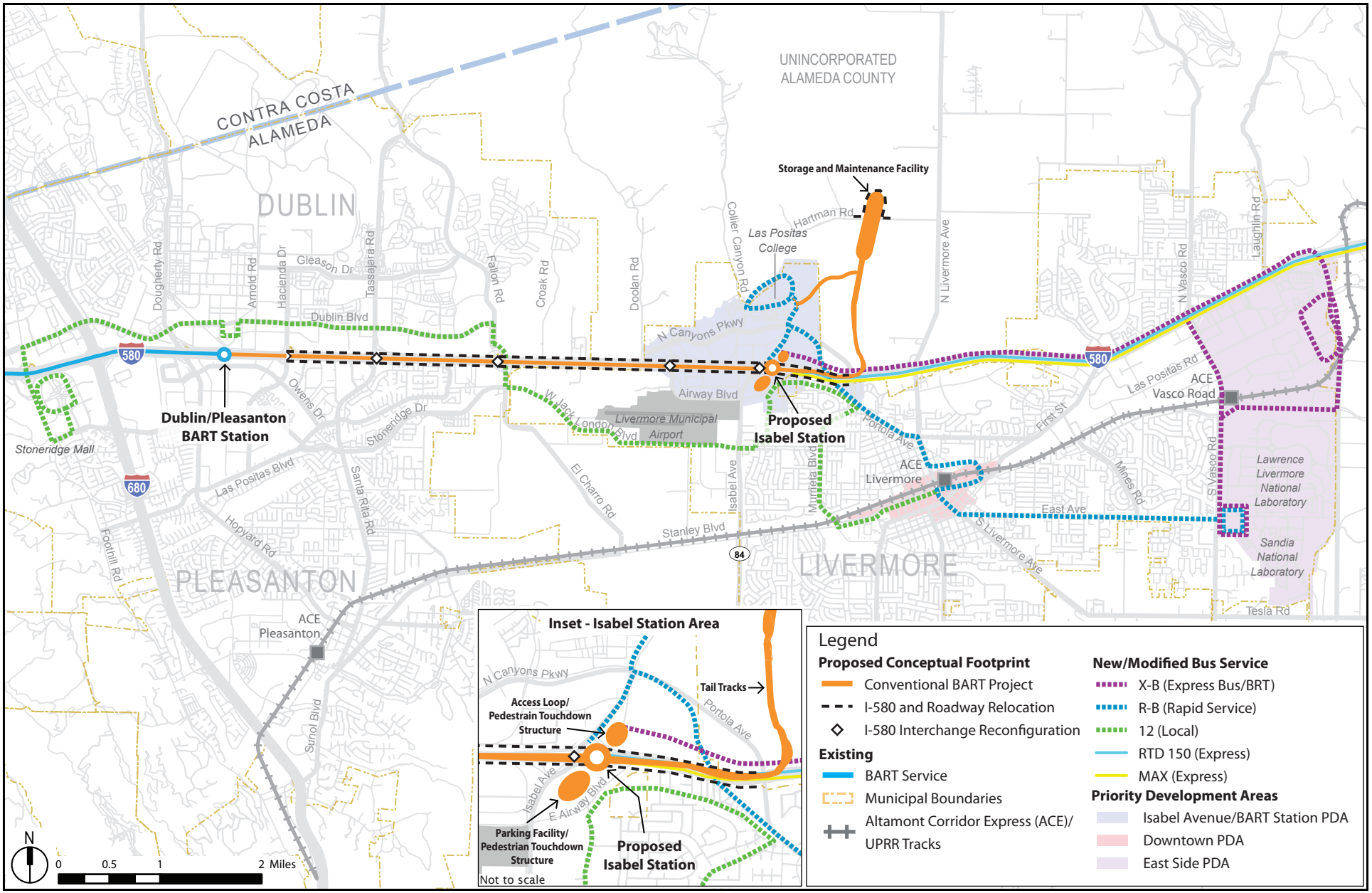
To accommodate the widening of the I-580 median for the new BART alignment and Isabel Station, the California Department of Transportation right-of-way would be widened along approximately 5.6 miles. The I-580 lanes would be relocated by a total of approximately 46 feet, from just east of the Hacienda Drive interchange to west of the Portola Avenue/I-580 overcrossing. At the proposed Isabel Station, I-580 would be relocated by approximately 67 feet to accommodate the new station within the median. The relocation of I-580 would require the modification of some interchanges and surface frontage roads.

The Proposed Project includes new and modified feeder bus routes that would connect the new Isabel Station to the Livermore Downtown PDA, the Livermore East Side PDA (which includes the Lawrence Livermore National Laboratory), and other areas east of the BART system, as well as to the Altamont Corridor Express (ACE) Stations in Downtown Livermore and Vasco Road.[1] The overall performance of these bus routes would be improved via the implementation of transit priority infrastructure enhancements, such as signal timing priority, bus shelters, and bus bulbs.

3. DMU Alternative

The DMU Alternative, shown in Figure S-2, differs from the Proposed Project in terms of vehicle technology. DMUs are self-propelled rail cars that use a diesel engine to generate their own power and run on a standard-gauge rail track, whereas BART trains use electricity and run on wide-gauge rail track.

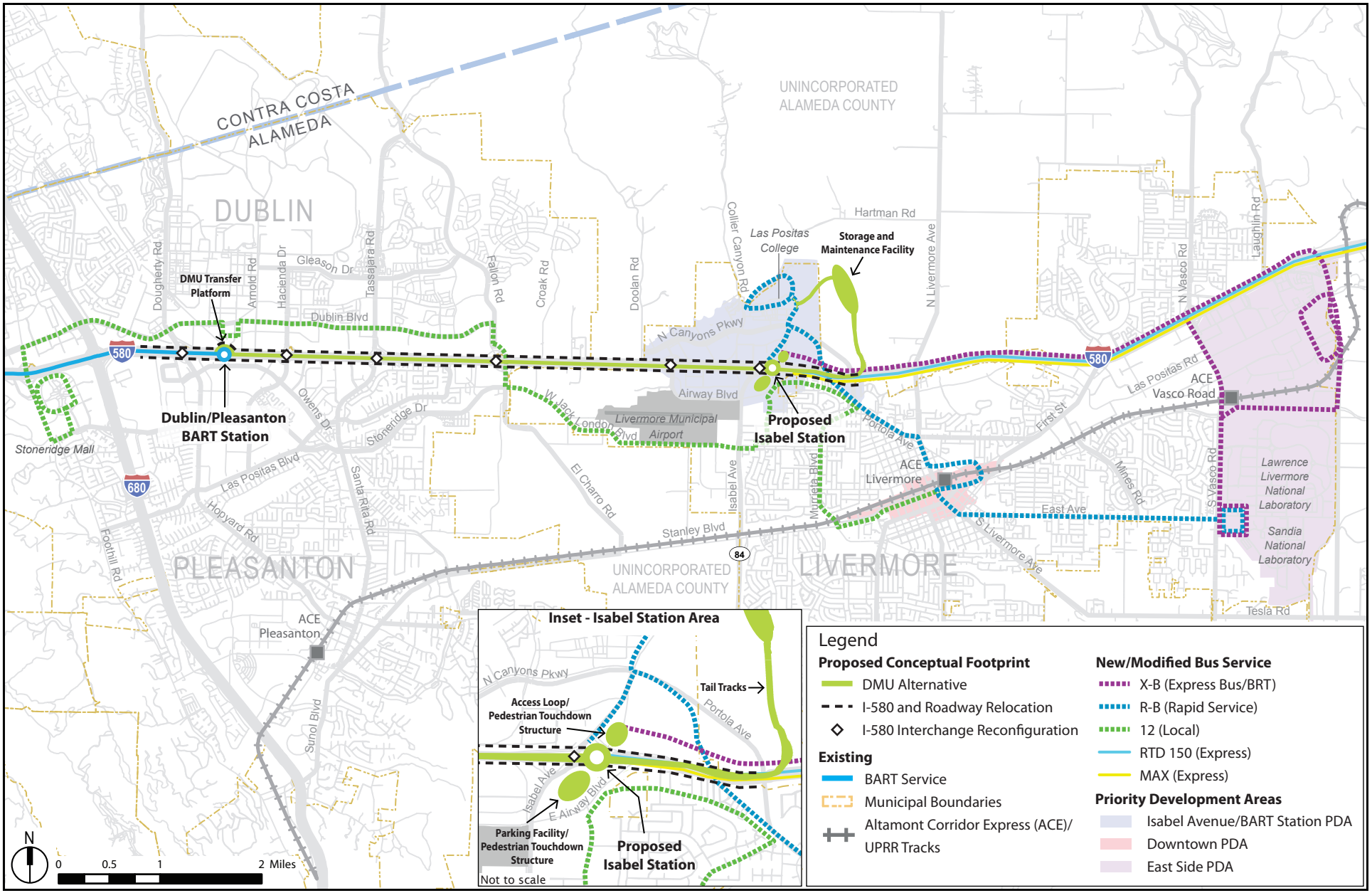
[1] Feeder bus routes would connect key activity nodes in Livermore to the BART system (either Dublin/Pleasanton Station or Isabel Station), and thereby improve service for existing BART patrons and support additional BART patronage.



Source: Arup, 2017a,b.

BART to Livermore Extension Project EIR

Figure S-1
Conventional BART Project Overview



Source: Arup, 2017a,b.

BART to Livermore Extension Project EIR

Figure S-2
DMU Alternative
Overview

The DMU Alternative would have a similar median alignment and station configuration as the Proposed Project, but would have a longer alignment and would include a new transfer platform at the Dublin/Pleasanton Station. A new parking structure for the Isabel Station, with approximately 2,428 parking spaces, would be constructed immediately south of I-580 along East Airway Boulevard. In addition, a new, approximately 32-acre storage and maintenance facility would be constructed north of I-580, beyond the terminus of the alignment.

To accommodate the median widening, approximately 7.1 miles of I-580 would be relocated by a total of approximately 46 feet, from west of Dougherty Road/Hopyard Road interchange to the Portola Avenue/I-580 overcrossing. Around the Dublin/Pleasanton Station, the north side of I-580 would be relocated to accommodate the new DMU transfer platform. At the proposed Isabel Station, I-580 would be relocated by a total of approximately 67 feet to accommodate the station in the median. The relocation of I-580 would require modification of some interchanges and surface frontage roads.

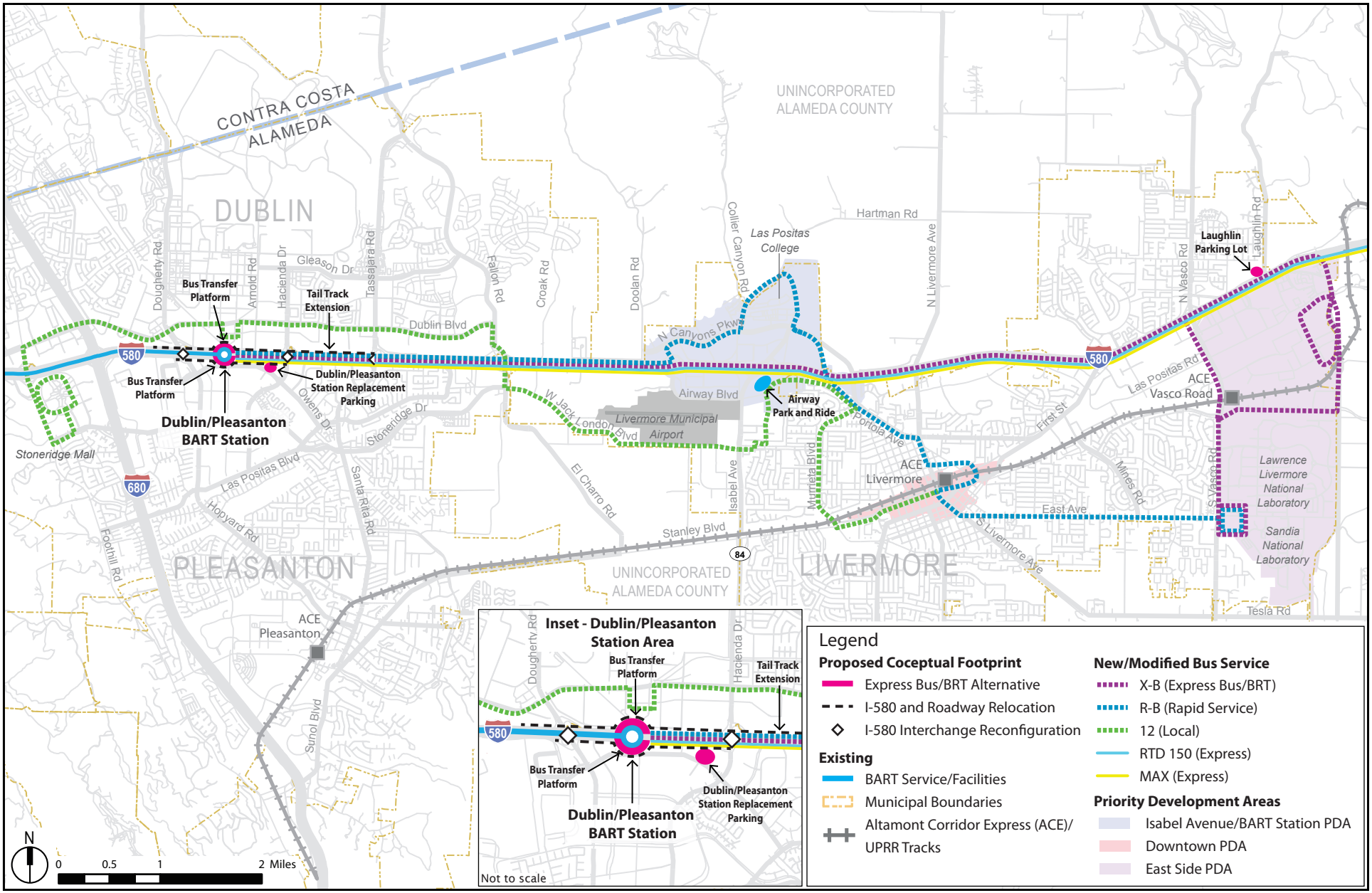
The DMU Alternative includes the same bus components as the Proposed Project, including new and modified feeder bus routes connecting the new station to areas east of the BART system.

A variant of the DMU Alternative—the EMU Option—is also being considered. The EMU Option is generally the same as the DMU Alternative, except that it is electrically powered rather than diesel-powered.

4. Express Bus/BRT Alternative

The Express Bus/BRT Alternative, shown in Figure S-3, seeks to achieve the project goals using bus technology only. Under this alternative, new bus transfer platforms would be constructed at the existing Dublin/Pleasanton Station; the bus platforms would be located to the outside of the existing BART station platforms. New bus ramps from the I-580 express lanes would be constructed for buses to enter and connect directly to the bus transfer platforms, allowing passengers to transfer from bus to BART without leaving the station.

To accommodate the new bus transfer platforms and facilities under this alternative, approximately 2.2 miles of I-580, from west of the Dougherty Road/Hopyard Road interchange to the Tassajara Road/Santa Rita Road interchange, would be relocated by approximately 88 feet. The relocation of I-580 would require modification of some interchanges and surface frontage roads.



Source: Arup, 2017a,b.

BART to Livermore Extension Project EIR

Figure S-3
Express Bus/BRT Alternative Overview

A new parking lot (or garage) with 210 parking spaces would be constructed at the Dublin/Pleasanton Station to replace parking lost due to the I-580 relocation. In addition, a remote, approximately 230-space park-and-ride lot would be constructed at Laughlin Road, with regular bus service during peak hours from the lot to the Dublin/Pleasanton Station.

This alternative includes a feeder bus operations plan similar to that of the Proposed Project and DMU Alternative. It would be designed to enhance direct connections between the Dublin/Pleasanton Station, Downtown Livermore, both the Downtown Livermore and Vasco Road ACE stations, and Livermore-area PDAs, as well as to maximize use of the I-580 high-occupancy vehicle/high-occupancy toll lanes. Bus service improvements include, but are not limited to, two new express/Rapid bus routes.

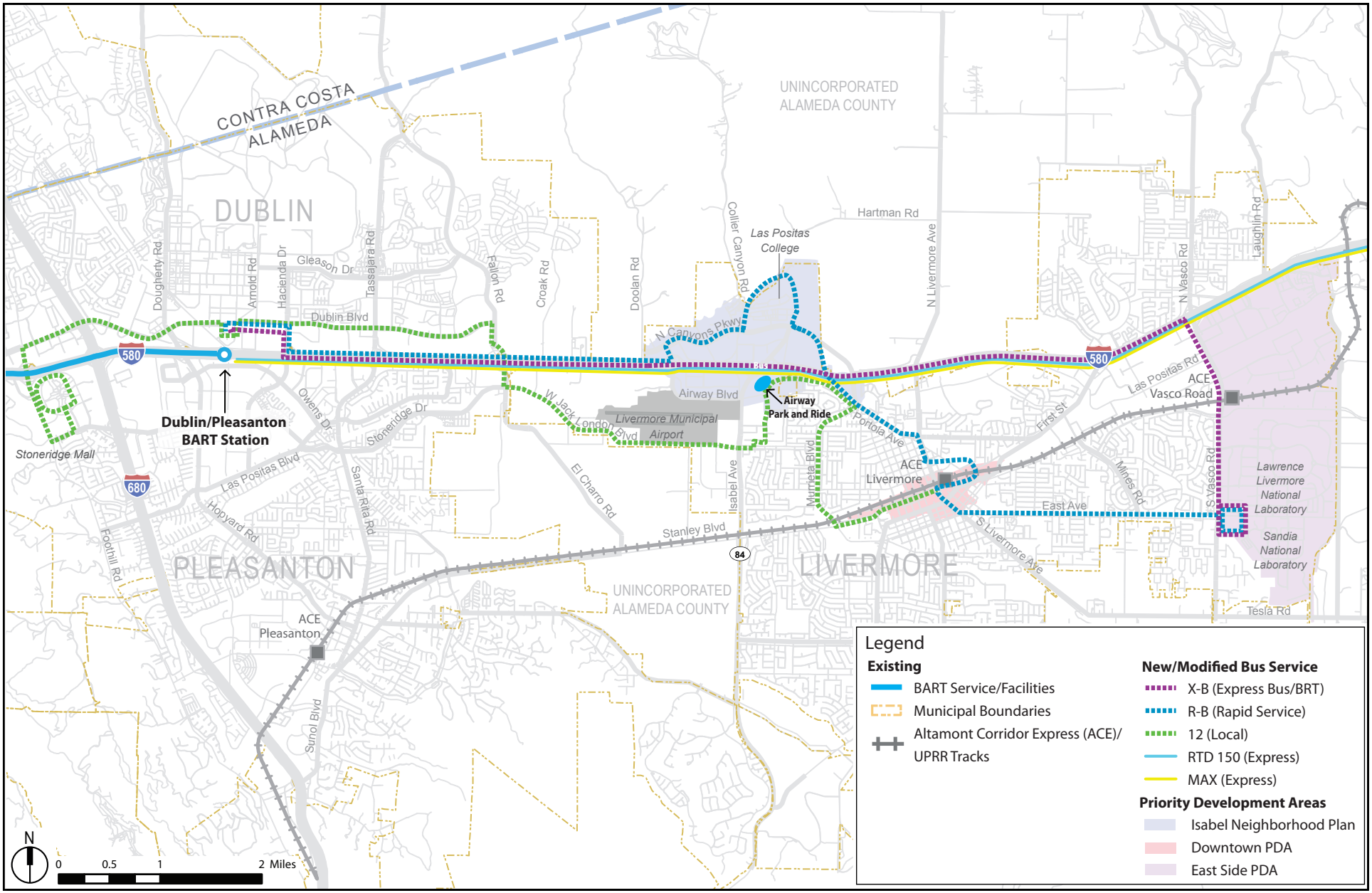
5. Enhanced Bus Alternative

Like the Express Bus/BRT Alternative, the Enhanced Bus Alternative, shown in Figure S-4, uses bus-related technology only, and does not include an extension of BART rail service or the development of a new rail station. Unlike the Express Bus/BRT Alternative, however, this alternative does not include any major capital improvements, and would not include the development of bus transfer platforms or direct bus ramps. This alternative provides lower-cost bus service improvements to improve access to the Dublin/Pleasanton Station.

The Enhanced Bus Alternative includes a bus operations plan that is similar to the plan for the feeder bus services for the Proposed Project and other Build Alternatives, designed to enhance direct connections to the Dublin/Pleasanton Station from Las Positas College, Downtown Livermore, and both the Downtown Livermore and Vasco Road ACE stations, as well as to serve existing and future Livermore PDAs.

6. Construction Schedule

Construction of the Proposed Project, DMU Alternative, or Express Bus/BRT Alternative is anticipated to begin in 2021 and last approximately 5 years through 2026. Construction activities would occur in phases at various locations along the project corridor. The Enhanced Bus Alternative, as well as the feeder bus improvements under the Proposed Project and other Build Alternatives would be constructed over approximately 2 months.



Source: Arup, 2017a,b.

BART to Livermore Extension Project EIR

Figure S-4
Enhanced Bus Alternative
Overview

7. Costs

The estimated costs for construction, operation, and maintenance of the Proposed Project and Build Alternatives are summarized below. Cost estimates are based on the preliminary engineering completed for the Proposed Project and Build Alternatives.

a. Capital Costs

The total estimated capital costs for the Proposed Project and Build Alternatives are presented in Table S-2. The capital costs for the Proposed Project and Build Alternatives, with costs escalated to the mid-point of construction, are as follows: approximately $1,635 million for the Proposed Project; approximately $1,599 million for the DMU Alternative; approximately $1,665 million for the EMU Option; approximately $376 million for the Express Bus/BRT Alternative; and approximately $25 million for the Enhanced Bus Alternative.

TABLE S-2 ESTIMATED CAPITAL COSTS FOR THE PROPOSED PROJECT AND BUILD ALTERNATIVES

	Dollars ($ Millions)				
	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative
Total Cost (2016$)	$1,329	$1,300	$1,353	$305	$21
Total Cost (escalated to construction mid-point)	$1,635	$1,599	$1,665	$376	$25

Notes: Estimates are based on primary engineering. Costs are based on 2016 dollars. Total project cost is escalated to the estimated mid-point of construction (2024).
Sources: Arup, 2017c; BART, 2017a.

The capital costs for the Proposed Project and Build Alternatives differ primarily based on the length of the rail alignment to be constructed and the length of I-580 corridor modifications that would be required to accommodate the Proposed Project and Build Alternatives. Specifically, the DMU Alternative would have the longest work zone along I-580, followed by the Proposed Project, with a substantially shorter work zone under the Express Bus/BRT Alternative, and no work along I-580 under the Enhanced Bus Alternative. In addition, the size of the storage and maintenance facility affects the cost of construction; e.g., the Proposed Project has a substantially larger facility than the DMU Alternative. The EMU Option has increased costs compared to the DMU Alternative, due to the additional infrastructure needed for electrification, i.e., the catenary system and wayside facilities.

The capital cost for the Proposed Project includes 25 percent of the cost to include a BART storage and maintenance facility. A BART storage and maintenance facility is needed to service the overall future needs of the Daly City-Dublin/Pleasanton Line.

b. Operating and Maintenance Costs

The total estimated annual operating costs for the Proposed Project and Build Alternatives in 2025 and 2040 are presented in Table S-3. Operating and maintenance costs in 2025 and 2040 are as follows for the Proposed Project and Build Alternatives:

- **Proposed Project**. Approximately $19.0 million in 2025 and $22.8 million in 2040
- **DMU Alternative**. Approximately $14.5 million in 2025 and $16.8 million in 2040
- **EMU Option**. Approximately $14.4 million in 2025 and $16.6 million in 2040
- **Express Bus/BRT Alternative.** Approximately $2.1 million in 2025 and $3.0 million in 2040
- **Enhanced Bus Alternative.** Approximately $1.7 million in both 2025 and 2040

TABLE S-3 OPERATING AND MAINTENANCE COSTS FOR THE PROPOSED PROJECT AND BUILD ALTERNATIVES

	Dollars ($ Millions)				
	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative
2025 – Operation and Maintenance Cost (2016$)	19.0	14.5	14.4	2.1	1.7
2040 – Operation and Maintenance Cost (2016$)	22.8	16.8	16.6	3.0	1.7

Notes: Costs are based on 2016 dollars.
Source: Arup, 2017d; BART, 2017b.

Operating and maintenance costs are higher for the Proposed Project and Build Alternatives in 2040 than in 2025 due to the higher level of service to accommodate increased ridership and the higher cost of providing service.

Similar to the capital cost, the operating cost for the Proposed Project includes 25 percent of the cost to operate a BART storage and maintenance facility.

E. PURPOSE OF THIS EIR

An EIR is a document that analyzes the environmental impacts of a proposed project on the physical environment. The main purposes of an EIR are to (1) inform governmental decisionmakers and the public about the potential significant environmental effects of proposed activities; (2) identify alternatives and mitigation measures that can feasibly avoid or reduce significant environmental impacts; (3) disclose to the public any significant environmental impacts that cannot feasibly be avoided.

BART is the lead agency for the BART to Livermore Extension Project and is responsible for conducting the requisite environmental review and adopting a project. The BART Board of Directors will review the EIR and other considerations to determine whether the Proposed Project or an alternative should be approved as proposed, approved with modifications, or not approved. This Draft EIR will also be reviewed by other public agencies, including the local jurisdictions, and by interested individuals and groups, to evaluate the potential impacts of the BART to Livermore Extension Project as well as the proposed mitigation measures and alternatives to reduce potential environmental impacts.

The BART Board of Directors will use the Final EIR (which will include the Draft EIR, comments received during the public review period, responses to those comments, and any revisions to the Draft EIR as a result of public agency and public comments, together with any other revisions initiated by BART) to decide whether to approve the Proposed Project or an alternative, and to specify any applicable mitigation measures as part of project approval.

F. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Under CEQA Guidelines 15382, a significant impact on the environment is defined as a substantial or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

As discussed in Chapter 3, Environmental Analysis, within the analysis for each respective resource topic, and shown in Table S-5 at the end of this chapter, the Proposed Project and Alternatives would result in several potentially significant impacts. The majority of the impacts identified would be mitigated to a less-than-significant level with implementation of the recommended mitigation measures. However, either project or cumulative impacts would be significant and unavoidable for the following resource topics:

- Transportation (for the Proposed Project, DMU Alternative/EMU Option, Express Bus/BRT Alternative, and Enhanced Bus Alternative)

- Land Use and Agricultural Resources (for the Proposed Project and DMU Alternative/EMU Option)
- Visual Quality (for the Proposed Project, DMU Alternative/EMU Option, and Express Bus/BRT Alternative)
- Cultural Resources (for the Proposed Project, DMU Alternative/EMU Option, Express Bus/BRT Alternative, and Enhanced Bus Alternative)
- Biological Resources (for the Proposed Project and DMU Alternative/EMU Option)
- Air Quality (for the Proposed Project, DMU Alternative/EMU Option, and Express Bus/BRT Alternative)
- Energy (for the Enhanced Bus Alternative only)

Table S-5 summarizes the significant environmental impacts and mitigation measures as identified in this EIR. The final significance determination is shown after implementation of mitigation measures. In many cases, significant impacts will be reduced to a less-than-significant level with implementation of mitigation measures. However, in some cases, impacts would remain significant and unavoidable, even after implementation of mitigation measures, or would remain significant and unavoidable because there are no feasible mitigation measures. The applicable mitigation measures to reduce the identified significant impacts to less-than-significant levels are also listed.

Impacts listed in the table include construction and operations impacts, as well as cumulative impacts, which are distinguished from project impacts by the addition of "(CU)" in the impact summary. Beneficial and less-than-significant impacts are not included in Table S-5.

G. SUMMARY OF BENEFITS

The beneficial effects of the BART to Livermore Extension Project are not environmental impacts under CEQA, and an EIR is not required to evaluate these relative benefits. However, this EIR presents the beneficial effects of the Proposed Project and Build Alternatives, in order for the public and decisionmakers to understand the improvements that could be achieved with implementation.

The Proposed Project and Build Alternatives would have beneficial effects, as identified in Chapter 3, Environmental Analysis, and summarized below. The quantifiable benefits are shown in Table S-4. Although benefits would also occur in 2025, this discussion focuses on benefits in 2040, when the BART to Livermore Extension Project would be in full operation and benefits would be greatest. In addition, this discussion focuses on project-

level benefits. See Chapter 4, Other CEQA Considerations, and Chapter, 5, Project Merits, for additional discussion, including benefits under Cumulative Conditions.

TABLE S-4 SUMMARY OF QUANTITATIVE BENEFICIAL EFFECTS IN 2040

Metric	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative
Transportation					
BART System Ridership (average weekday)	+11,900	+7,000	+7,000	+3,500	+400
Vehicle Miles Traveled (average weekday)	-244,000	-140,600	-140,600	-92,600	-6,500
Greenhouse Gas Emissions					
Annual GHG Emissions (metric tons of CO_2e/year)	-11,200	-3,500	-6,000	-3,700	--
Energy					
Regional Energy Consumption (millions British Thermal Units/year)	-130,800	-35,000	-66,500	-56,800	--

Note: -- = No benefit; The Enhanced Bus Alternative would increase GHG emissions by 600 metric tons of CO_2e/year and energy use by 8,200 million British Thermal Units/year.
All numbers have been rounded to the nearest hundred.
Data presented represents the difference between the 2040 No Project Conditions and the 2040 Project Conditions. Positive values represent an increase and negative values represent a decrease.

- **Transportation**. As described in Section 3.B, Transportation, benefits would occur with regard to increased systemwide BART ridership and reduction in total vehicle miles traveled (VMT), as well as pedestrian and bicycle improvements.[2]
  - In 2040, the Proposed Project and Build Alternatives would achieve both an increase in BART systemwide ridership and a reduction in total VMT, as travelers switch from driving to transit.
    - The Proposed Project would result in the greatest increase in BART systemwide ridership, by 11,900 additional riders, as well as the greatest reduction of VMT, by 244,000.
    - The DMU Alternative or EMU Option would increase ridership by 7,000 additional riders, and reduce VMT by 140,600.

[2] Total VMT is the combination of passenger VMT reductions and bus VMT increases (see Table 3.B-30 in Section 3.B, Transportation).

  - The Express Bus/BRT Alternative would increase ridership by 3,500 additional riders, and reduce VMT by 92,600.
  - The Enhanced Bus Alternative would result in the smallest increase in ridership, by 400 additional riders, and smallest reduction in VMT, by 6,500.
- Under **Impacts TRAN-10** and **TRAN-11**, the Proposed Project and DMU Alternative or EMU Option would have beneficial effects pertaining to bicycle and pedestrian access, circulation, and safety. Specifically, the Proposed Project and DMU Alternative (or EMU Option) would incorporate pedestrian and bicycle access improvements in the vicinity of the proposed Isabel Station, including (1) a new sidewalk along the north side of East Airway Boulevard; and (2) a new I-580 pedestrian and bicycle overcrossing of I-580 that would connect to the Isabel Station from both the north and south sides of I-580, eliminating the need for pedestrians to cross the I-580 ramps. The Express Bus/BRT Alternative and Enhanced Bus Alternative would not have any beneficial effects for pedestrians and bicyclists.

- **Air Quality.** As described in Section 3.K, Air Quality, under **Impact AQ-16**, the Proposed Project and Build Alternatives would be consistent with the 2017 Clean Air Plan—the most recently adopted air quality plan for the Bay Area—and support implementation of the plan. The Proposed Project and DMU Alternative or EMU Option would add a rail extension from Dublin/Pleasanton Station to Isabel Station. The Proposed Project and Build Alternatives would also add new express and rapid bus routes as well as bus-related infrastructure improvements.
- **Greenhouse Gas Emissions.** As described in Section 3.L, Greenhouse Gas Emissions, under **Impact GHG-4**, the Proposed Project, DMU Alternative, EMU Option, and Express Bus/BRT Alternative would result in a reduction in GHG emissions associated with reductions in VMT in 2040.
  - The Proposed Project would result in the greatest reduction in GHG emissions, 11,200 metric tons per year.
  - The EMU Option would reduce GHG emissions by 6,000 metric tons per year.
  - The DMU Alternative would reduce GHG emissions by 3,500 metric tons per year.
  - The Express Bus/BRT Alternative would reduce GHG emissions by 3,700 metric tons per year.
  - However, the Enhanced Bus Alternative would result in an increase of 600 metric tons per year, as emission reductions associated with its small number of riders and small VMT reductions would not be enough to outweigh the emissions from the bus itself. This would not represent a benefit.
- **Energy Consumption**. As described in Section 3.M, Energy, under **Impact EN-4,** the Proposed Project, DMU Alternative, EMU Option, and Express Bus/BRT Alternative

would result in a reduction in energy consumption associated with reductions in VMT in 2040.

- The Proposed Project would result in the greatest reduction in energy consumption, by 130,800 MMBTU per year.
- The EMU Option would reduce energy consumption by 66,500 MMBTU per year.
- The Express Bus/BRT Alternative would reduce energy consumption by 56,800 MMBTU per year.
- The DMU Option would reduce energy consumption by 35,000 MMBTU per year.
- However, the Enhanced Bus Alternative would result in an increase in energy consumption by 8,200 MMBTU per year, again because reductions associated with its small number of riders and small VMT reductions would not be enough to outweigh the energy consumption from the bus itself. This would not represent a benefit.

H. AREAS OF CONTROVERSY

CEQA Guidelines Section 15123(b) requires that areas of controversy known to the lead agency be identified, including issues raised by other agencies and the public. A full list of public comments received during the scoping period is available in the scoping report at http://www.bart.gov/about/projects/liv/environment, as well as summarized in Chapter 1, Introduction. The following is a short list of areas of controversy:

- Examine how the BART extension will affect the air quality in the study area, as well as localized impacts to sensitive receptors and residents
- Consider how a BART extension would affect greenhouse gas emissions
- Examine impacts to agricultural land
- Determine the combined noise impacts of the automobile traffic and BART trains
- Identify full parking need at Isabel Station
- Evaluate the traffic impacts from a new station
- Determine details of new bus operations
- Consider the impacts to scenic resources along I-580
- Consider both daytime and nighttime construction impacts on the freeway
- Issues to be resolved include adoption of a project and funding availability

I. NEXT STEPS

This subsection describes the CEQA process commencing with publication of this Draft EIR.

1. Where Can I Review the Draft EIR?

Copies of the Draft EIR can be reviewed in a number of ways. The Draft EIR can be downloaded from BART's website at: http://www.bart.gov/about/projects/liv. To obtain a copy of the Draft EIR on CD-ROM, email BartToLivermore@bart.gov or call (888) 441-0434.

The Draft EIR can be reviewed at the following public libraries:

Livermore Library – Civic Center Branch
1188 South Livermore Avenue
Livermore, CA 94550

Pleasanton Library
400 Old Bernal Avenue
Pleasanton, CA 94566

Springtown Library
998 Bluebell Drive
Livermore, CA 94551

Dublin Public Library
200 Civic Plaza
Dublin, CA 94568

Rincon Library
725 Rincon Avenue
Livermore, CA 94551

The Draft EIR and related documents can also be reviewed at the following location:

San Francisco Bay Area Rapid Transit District
300 Lakeside Drive, 21st Floor
Oakland, CA 94612

Contact the BART to Livermore Extension Project to set up an appointment by using the email address or phone numbers above.

2. How Do I Comment on the Draft EIR?

This Draft EIR is being distributed for a 45-day public review and comment period, which extends from July 31, 2017 through September 14, 2017 at 5:00 p.m. During the public review period, two public meetings will be held to receive comments on the Draft EIR as noted below.

Readers are invited to submit written comments on the adequacy of the document; i.e., does this Draft EIR identify and analyze the possible environmental impacts of the Proposed Project and Build Alternatives, and recommend appropriate mitigation measures? Comments are most helpful when they are specific and targeted to the environmental assessment; for example, by identifying specific impacts that need further

evaluation and what additional information is desired, or by describing alternatives or mitigation measures that would better address significant environmental effects.

Written comments should be submitted to:

San Francisco Bay Area Rapid Transit District
Attention: BART to Livermore Extension Project
300 Lakeside Drive, 21st Floor
Oakland, CA 94612

Comments may also be sent via the website (http://www.bart.gov/about/projects/liv), or via email at BartToLivermore@bart.gov. For more information, please email BartToLivermore@bart.gov or call (888) 441-0434. (Please note that comments cannot be accepted by phone.)

The Notice of the Availability of the Draft EIR, which explains how to submit written or verbal comments on the EIR and the dates and locations of the public meetings has been mailed to responsible agencies and noticed to the public in the following ways:

- Published in The Independent, Pleasanton Weekly, Pleasanton Express, Danville Express, East Bay Times, Tri Valley Times, and San Ramon Valley Times
- Mailed to addresses within 0.5 mile of the footprints of the Proposed Project, DMU Alternative, and Express Bus/BRT Alternative
- Emailed to addresses on BART's email notification list and to individuals and organizations who have submitted a written request for notification concerning the Proposed Project

3. When and Where Will the Public Hearing Take Place?

There will be two public hearings:

Date: Tuesday, August 22, 2017	Date: Tuesday, August 29, 2017
Time: 6:00-9:00pm	Time: 6:00-9:00pm
Location: Robert Livermore Community Center 4448 Loyola Way Livermore, CA 94550	Location: Shannon Community Center 11600 Shannon Avenue Dublin, CA 94568

4. What Will Happen at the Public Hearing?

At the public hearing, BART staff will describe the BART to Livermore Extension Project and will solicit comments from the public. Following the close of the public review and comment period, written responses will be prepared that address all substantive written and oral comments on the Draft EIR. The Final EIR will consist of the Draft EIR, comments received during the public review period, responses to those comments, and any

revisions to the Draft EIR as a result of public agency and public comments, together with any other revisions initiated by BART.

5. How Will a Decision Be Made to Adopt a Project?

The BART Board of Directors must certify that it has reviewed and considered the information in the EIR, and that the EIR has been completed in conformity with the requirements of CEQA, before any decision can be made regarding the BART to Livermore Extension Project. The BART Board of Directors will consider the potential project impacts and the benefits as well as any other economic, legal, social, technological, or other considerations to determine whether the Proposed Project or an Alternative should be approved as proposed, approved with modifications, or not approved.

Public agencies cannot approve or carry out a project if it would result in a significant or unavoidable effect, unless the public agency makes one or more of the following findings, which would require support by substantial evidence in the record:

- Changes or alterations have been required in, or incorporated into, the action that avoid or substantially lessen the significant environmental effect.
- Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or program alternatives identified in the Final EIR.

If the BART Board of Directors decides to approve the Proposed Project or an Alternative that has significant effects identified in the Final EIR, but that are not avoided or substantially lessened, the BART Board of Directors must prepare a Statement of Overriding Considerations that makes findings that any unavoidable significant effects are acceptable due to overriding considerations as described in CEQA Guidelines Section 15093. In preparing this statement, CEQA requires the BART Board of Directors to balance the specific benefits of the proposed action against its unavoidable environmental impacts. If the benefits of the proposed action outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered acceptable.

If a project goes forward, it may also require evaluation under the National Environmental Policy Act (NEPA). Projects that make certain modifications to a federal highway or require federal funding are subject to NEPA. Both the Proposed Project and the DMU Alternative would likely require federal funding. The Express Bus/BRT Alternative would affect access to I-580. Therefore, the Proposed Project and two of the three Build Alternatives would likely require an Environmental Impact Statement under NEPA. An Environmental Impact Statement, should one be necessary, would be prepared subsequent to completion of the

CEQA process and BART Board of Directors adoption of the Proposed Project, DMU Alternative (or EMU Option), or Express Bus/BRT Alternative. It is anticipated that the Enhanced Bus Alternative would not be subject to NEPA.

6. How Will the Mitigation Measures Identified in the EIR Be Implemented?

As part of the project approval process, the BART Board of Directors must also consider and adopt a mitigation monitoring and reporting program. This program will include all mitigation measures that BART will implement to avoid or reduce significant effects identified in the Final EIR. For each measure, the program will identify the following items: the responsible party for implementing the mitigation measure, the timeframe by which the measure should be implemented, and whether there are interim milestones to determine the successes or effectiveness of the mitigation measure. BART will use the mitigation monitoring reporting program as a mechanism to track implementation of all mitigation measures during construction and operation of the adopted project.

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
3.B TRANSPORTATION								
Impact TRAN-1: Result in a significant delay, safety hazard, or diminished access during construction		✓	✓	✓	✓		**Mitigation Measure TRAN-1:** Develop and Implement a Construction Phasing and Traffic Management Plan	LSM
Impact TRAN-3: General-purpose lane freeway segments operating at unacceptable LOS, under 2025 Project Conditions		✓	✓	✓	✓		No feasible mitigation measures	SU
Impact TRAN-4: General-purpose lane freeway segments operating at unacceptable LOS, under 2040 Project Conditions		✓	✓	✓			No feasible mitigation measures	SU
Impact TRAN-5: HOV/express lane freeway segments operating at unacceptable LOS, under 2025 Project Conditions			✓	✓			No feasible mitigation measures	SU

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact TRAN-7: Intersections operating at unacceptable LOS, under 2025 Project Conditions		✓	✓	✓	✓		**Mitigation Measure TRAN-7a:** Improvements for Intersections #2, #5, #39, and #48 under 2025 Project Conditions (*Conventional BART Project*) **Mitigation Measure TRAN-7b:** Improvements for Intersections #2, #5, and #48 under 2025 Project Conditions (*DMU Alternative/EMU Option)* **Mitigation Measure TRAN-7c:** Improvements for Intersection #48 under 2025 Project Conditions (*Express Bus/BRT Alternative)*	LSM (Express Bus/BRT Alternative) SU (Conventional BART and DMU Alternative/EMU Option)
Impact TRAN-8: Intersections operating at unacceptable LOS, under 2040 Project Conditions		✓	✓	✓	✓		**Mitigation Measure TRAN-8a:** Improvements for Intersections #1, #2, #5, #35, #39, #45, #48, and #50 under 2040 Project Conditions (*Conventional BART Project*) **Mitigation Measure TRAN-8b:** Improvements for Intersections #1, #2, #5, and #48 under 2040 Project Conditions (*DMU Alternative/EMU Option*) **Mitigation Measure TRAN-8c:** Improvements for Intersection #5 under 2040 Project Conditions (*Express Bus/BRT Alternative*)	SU

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact TRAN-16(CU): General-purpose lane freeway segments operating at unacceptable LOS, under 2040 Cumulative Conditions		✓	✓	✓			No feasible mitigation measures	SU
Impact TRAN-19(CU): Intersections operating at unacceptable LOS, under 2025 Cumulative Conditions		✓	✓	✓	✓	✓	**Mitigation Measure TRAN-19a:** Improvements for Intersections #5, #38, #39, and #48 under 2025 Cumulative Conditions (*Conventional BART Project*) **Mitigation Measure TRAN-19b:** Improvements for Intersections #2, #5, #48, and #50 under 2025 Cumulative Conditions (*DMU Alternative/EMU Option*) **Mitigation Measure TRAN-19c:** Improvements for Intersection #2 under 2025 Cumulative Conditions (*Express Bus/BRT Alternative*) **Mitigation Measure TRAN-19d:** Improvements for Intersection #48 and #50 under 2025 Cumulative Conditions (*Enhanced Bus Alternative*)	LSM (Express Bus/BRT Alternative and Enhanced Bus Alternative) SU (Conventional BART and DMU Alternative/EMU Option)

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact TRAN-20(CU): Intersections operating at unacceptable LOS, under 2040 Cumulative Conditions		✓	✓	✓	✓	✓	**Mitigation Measure TRAN-20a:** Improvements for Intersections #1, #2, #17, #35, #38, #39, #45, #48, and #50 under 2040 Cumulative Conditions (*Conventional BART Project*) **Mitigation Measure TRAN-20b:** Improvements for Intersections #1, #2, #5, #17, #35, #39, #48, and #50 under 2040 Cumulative Conditions (*DMU Alternative/EMU Option*) **Mitigation Measure TRAN-20c:** Improvements for Intersections #1, #2, #5, and #50 under 2040 Cumulative Conditions (*Express Bus/BRT Alternative*) **Mitigation Measure TRAN-20d:** Improvements for Intersections #1, #2, #5, #17, and #50 under 2040 Cumulative Conditions (*Enhanced Bus Alternative*)	SU
3.C LAND USE AND AGRICULTURAL RESOURCES								
Impact AG-1: Directly convert Farmland		✓	✓	✓			**Mitigation Measure AG-1:** Provide Compensatory Farmland under Permanent Protection	SU
Impact AG-3: Conflict with zoning for agricultural use		✓	✓	✓			See **Mitigation Measure AG-1** (above)	SU
Impact AG-5(CU): Convert or result in conversion of Farmland		✓	✓	✓			No feasible mitigation measures	SU

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
3.D POPULATION AND HOUSING								
Impact PH-2: Displace substantial numbers of existing housing or people necessitating the construction of replacement housing elsewhere		✓	✓	✓			**Mitigation Measure PH-2:** Acquisition of Property and Relocation Assistance	LSM
Impact PH-3: Displace substantial numbers of existing businesses		✓	✓	✓	✓		See **Mitigation Measure PH-2** (above)	LSM
3.E VISUAL QUALITY								
Impact VQ-1: Substantially degrade the existing visual quality or create a new source of substantial light or glare during construction		✓	✓	✓	✓		**Mitigation Measure VQ-1.A:** Visually Screen Staging Areas **Mitigation Measure VQ-1.B:** Minimize Light Spillover During Construction	LSM
Impact VQ-3: Substantially degrade the existing visual quality		✓	✓	✓			**Mitigation Measure VQ-3.A:** Design Sound Wall with Architectural Treatments **Mitigation Measure VQ-3.B:** Design Parking Garage with Architectural Treatments **Mitigation Measure VQ-3.C:** Screen Storage and Maintenance Facility	SU
Impact VQ-4: Have a substantial adverse effect on a scenic vista		✓	✓	✓			No feasible mitigation measures	SU
Impact VQ-5: Substantially damage scenic resources within State scenic highway		✓	✓	✓	✓		**Mitigation Measure VQ-5:** Revegetate Areas of Removed Landscaping	SU

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact VQ-6: Create a new source of substantial light or glare		✓	✓	✓	✓		**Mitigation Measure VQ-6:** Design and Install Lighting Fixtures to Reduce Spillover	LSM (Express Bus/BRT Alternative) SU (Conventional BART and DMU Alternative/EMU Option)
Impact VQ-7(CU): Have a substantial visual impact under Cumulative Conditions		✓	✓	✓	✓		No feasible mitigation measures	SU
3.F CULTURAL RESOURCES								
Impact CUL-2: Cause a substantial adverse change in the significance of an archaeological resource		✓	✓	✓	✓	✓	**Mitigation Measure CUL-2.A:** Archaeological Resources Investigation for the Cayetano Creek Area (*Conventional BART Project and DMU Alternative/EMU Option*) **Mitigation Measure CUL-2.B:** Discovery of Previously Unknown Archaeological Resources (*Conventional BART Project, DMU Alternative/EMU Option, Express Bus/BRT Alternative, and Enhanced Bus Alternative*)	LSM
Impact CUL-3: Disturb any human remains		✓	✓	✓	✓	✓	**Mitigation Measure CUL-3:** Discovery of Previously Unknown Human Remains	LSM

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact CUL-4(CU): Cause a substantial adverse change in the significance of a historical resource, archaeological resources, or disturb human remains under Cumulative Conditions		✓	✓	✓	✓	✓	See **Mitigation Measure CUL-2.A**, **CUL-2.B**, and **CUL-3** (above)	SU
3.G GEOLOGY, SOILS, SEISMICITY, MINERAL, AND PALEONTOLOGICAL RESOURCES								
Impact PALEO-1: Loss of paleontological resources		✓	✓	✓	✓		**Mitigation Measure PALEO-1A:** Surface Paleontological Survey of the Cayetano Creek Area (*Conventional BART Project and DMU Alternative/EMU Option*) **Mitigation Measure PALEO-1B:** Paleontological Monitoring (*Conventional BART Project, DMU Alternative/EMU Option, and Express Bus/BRT Alternative*) **Mitigation Measure PALEO-1C:** Discovery of Previously Unknown Paleontological Resources (*Conventional BART Project, DMU Alternative/EMU Option, and Express Bus/BRT Alternative*)	LSM
Impact GEO-5: Fault rupture		✓					**Mitigation Measure GEO-5:** Geotechnical Investigation of the Cayetano Creek Area and Development of Project Design Features	LSM

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
3.H HYDROLOGY AND WATER QUALITY								
Impact HYD-5: Substantially alter drainage patterns – erosion, sedimentation, flooding		✓	✓	✓	✓		**Mitigation Measure HYD-5:** Hydraulic Capacity for Non-Flood Hazard Area Crossings	LSM
Impact HYD-9: Impede or redirect flood flows within a 100-year flood hazard area		✓	✓	✓	✓		**Mitigation Measure HYD-9:** Floodway Hydraulic Analysis	LSM
3.I BIOLOGICAL RESOURCES								
Impact BIO-1: Adversely affect special-status plants, either directly or through habitat modifications		✓	✓	✓	✓		**Mitigation Measure BIO-1.A:** Botanical Surveys for Areas Not Previously Surveyed and Refinement of Project Design **Mitigation Measure BIO-1.B:** Salvage and Relocation of Rare Plants that Cannot be Avoided	LSM
Impact BIO-2: Adversely affect vernal pool fairy shrimp and longhorn fairy shrimp		✓	✓	✓			**Mitigation Measure BIO-2:** Consult with USFWS and Reduce Impacts on Vernal Pool Invertebrates and Their Habitat in the I-580 Corridor Area (north of Croak Road) and Cayetano Creek Area	LSM

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact BIO-3: Adversely affect California tiger salamander and California red-legged frog		✓	✓	✓	✓		**Mitigation Measure BIO-3.A:** Consult with USFWS, Survey Potential Habitat, and Reduce Impacts on Special-status Amphibians during Construction **Mitigation Measure BIO-3.B:** Provide Compensatory Habitat to Mitigate for the Loss and Disturbance of CTS and CRLF Habitat **Mitigation Measure BIO-3.C:** General Measures for Biological Resources Protection during Construction	LSM
Impact BIO-4: Adversely affect western spadefoot		✓	✓	✓			**Mitigation Measure BIO-4:** Preconstruction Survey and Avoidance Measures for the Western Spadefoot	LSM
Impact BIO-5: Adversely affect western pond turtle		✓	✓	✓	✓		**Mitigation Measure BIO-5:** Preconstruction Surveys and Relocation of Western Pond Turtle	LSM
Impact BIO-6: Adversely affect western burrowing owl		✓	✓	✓	✓		**Mitigation Measure BIO-6.A:** Preconstruction Surveys for Burrowing Owl (*Conventional BART Project, DMU Alternative/EMU Option, and Express Bus/BRT Alternative*) **Mitigation Measure BIO-6.B:** Off-site Compensatory Habitat for Burrowing Owl (*Conventional BART Project and DMU Alternative/EMU Option*)	LSM

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact BIO-7: Adversely affect nesting raptors and other nesting birds		✓	✓	✓	✓	✓	**Mitigation Measure BIO-7:** Identify and Avoid Active Nesting Birds during Nesting Season	LSM
Impact BIO-8: Adversely affect special-status bats		✓	✓	✓	✓		**Mitigation Measure BIO-8:** Preconstruction Surveys and Avoidance Measures for Pallid Bat	LSM
Impact BIO-9: Adversely affect American badger		✓	✓	✓			**Mitigation Measure BIO-9:** Preconstruction Surveys and Avoidance Measures for American Badger	LSM
Impact BIO-10: Adversely affect San Joaquin kit fox		✓	✓	✓	✓		**Mitigation Measure BIO-10.A:** Preconstruction Surveys and Avoidance Measures for the San Joaquin Kit Fox (*Conventional BART Project and DMU Alternative/EMU Option*) **Mitigation Measure BIO-10.B:** Provide Compensatory Habitat to Mitigate for the Loss and Disturbance of San Joaquin Kit Fox Habitat (*Conventional BART Project and DMU Alternative/EMU Option*) See **Mitigation Measure BIO-3.C** above *(Express Bus/BRT Alternative)*	LSM
Impact BIO-11: Have a substantial adverse effect on State or federally protected wetlands or waters		✓	✓	✓	✓		**Mitigation Measure BIO-11.A:** Avoid and Minimize Impacts to Wetlands, Waters of the U.S. and/or Waters of the State **Mitigation Measure BIO-11.B:** Compensatory Mitigation for Wetlands, Waters of the U.S. and/or Waters of the State	LSM

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact BIO-12: Have a substantial adverse effect on riparian habitat or sensitive natural communities		✓	✓	✓	✓		**Mitigation Measure BIO-12.A:** Identify and Avoid Sensitive Natural Communities **Mitigation Measure BIO-12.B:** Compensate for Impacts to CDFW-regulated Sensitive Upland Plant Communities	LSM
Impact BIO-15: Result in loss of protected tees identified in local policies or ordinances		✓	✓	✓	✓		**Mitigation Measure BIO-15:** Conduct an Inventory of Protected Trees, Protect Trees that Remain, and Plant Replacement Trees	LSM
Impact BIO-16(CU): Adversely affect species identified as a candidate, sensitive, or special-status under Cumulative Conditions		✓	✓	✓			No additional mitigation measures beyond those identified for project impacts	SU
3.J NOISE AND VIBRATION								
Impact NOI-1: Expose persons to or generate noise or vibration levels in excess of standards during construction		✓	✓	✓	✓		**Mitigation Measure NOI-1:** Limit Construction Hours and Methods for Pile Driving and Other Construction Activities	LSM
Impact NOI-5: Result in a substantial permanent increase in ambient noise levels from roadway realignment and traffic distribution in the project vicinity under 2025 Project Conditions		✓	✓	✓			**Mitigation Measure NOI-5:** Construct Noise Barrier along Airway Boulevard	LSM

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact NOI-6: Result in a substantial permanent increase in ambient noise levels from roadway realignment and traffic distribution in the project vicinity under 2040 Project Conditions		✓	✓	✓			See **Mitigation Measure NOI-5** (above)	LSM
Impact NOI-7: Expose persons to or generate excessive groundborne vibration or groundborne noise levels under 2025 and 2040 Project Conditions			✓				**Mitigation Measure NOI-7:** Vibration-Reducing Design Elements	LSM
3.K AIR QUALITY								
Impact AQ-1: Result in potentially significant, localized dust-related air quality impacts during construction		✓	✓	✓	✓	✓	**Mitigation Measure AQ-1:** BAAQMD Construction Best Management Practices	LSM
Impact AQ-2: Generate emissions of NO_x, PM, and ROGs exceeding BAAQMD significance thresholds during construction		✓	✓	✓			**Mitigation Measure AQ-2:** Construction Emissions Reduction Plan – for Mitigating Mass Emissions for NO_x	LSM
Impact AQ-3: Generate TAC and $PM_{2.5}$ emissions that result in health risks above the BAAQMD significance thresholds during construction		✓	✓	✓	✓		**Mitigation Measure AQ-3:** Construction Emissions Reduction Plan – for Mitigating Cancer Risk	LSM

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact AQ-7(CU): Generate TAC and $PM_{2.5}$ emissions that result in health risks above the BAAQMD significance thresholds during construction under Cumulative Conditions		✓	✓	✓			See **Mitigation Measure AQ-3** (above)	SU
Impact AQ-12: Result in increased emissions of TACs and $PM_{2.5}$, resulting in increased health risk above BAAQMD significance thresholds under 2040 Project Conditions	✓						Not applicable	S
Impact AQ-18(CU): Result in increased emissions of TACs and $PM_{2.5}$, resulting in increased health risk above BAAQMD significance thresholds under 2025 Cumulative Conditions		✓	✓	✓	✓		No feasible mitigation measures	SU
Impact AQ-19(CU): Result in increased emissions of TACs and $PM_{2.5}$, resulting in increased health risk above BAAQMD significance thresholds under 2040 Cumulative Conditions	✓	✓	✓	✓			No feasible mitigation measures	S (No Project Alternative) SU (Conventional BART and DMU Alternative/EMU Option)

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
3.L GREENHOUSE GAS EMISSIONS								
Impact GHG-3: Generate GHG emissions, either directly or indirectly, above BAAQMD significance thresholds, or conflict with plans, policies, or regulations that reduce GHG emissions, under 2025 Project Conditions						✓	**Mitigation Measure GHG-3:** Obtain Carbon Offsets For Bus Emissions	LSM
Impact GHG-4: Generate GHG emissions, either directly or indirectly, above BAAQMD significance thresholds, or conflict with plans, policies, or regulations that reduce GHG emissions, under 2040 Project Conditions	✓						Not applicable	S
Impact GHG-6(CU): Generate GHG emissions, either directly or indirectly, above BAAQMD significance thresholds, or conflict with plans, policies, or regulations that reduce GHG emissions under 2040 Cumulative Conditions	✓						Not applicable	S

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
3.M ENERGY								
Impact EN-3: Result in wasteful, inefficient, or unnecessary consumption of energy, under 2025 Project Conditions						✓	**Mitigation Measure EN-3:** Incorporate Renewable Energy Features	SU
Impact EN-4: Result in wasteful, inefficient, or unnecessary consumption of energy, under 2040 Project Conditions	✓					✓	See **Mitigation Measure EN-3** (above)	S (No Project Alternative) SU (Enhanced Bus Alternative)
Impact EN-6(CU): Result in wasteful, inefficient, or unnecessary consumption of energy, under 2040 Cumulative Conditions	✓						Not applicable	S
3.N PUBLIC HEALTH AND SAFETY								
Impact PHS-1: Create a potential public or environmental health hazard; undue potential risk for health-related accidents; or result in a safety hazard for people residing or working in the project area during construction		✓	✓	✓	✓	✓	**Mitigation Measure PHS-1.A:** Prepare Phase I ESA and Phase II ESA, as Necessary **Mitigation Measure PHS-1.B:** Soil Management Plan **Mitigation Measure PHS-1.C:** Hazardous Materials and Hazardous Waste Management Plan **Mitigation Measure PHS-1.D:** Fueling Procedures during Construction **Mitigation Measure PHS-1.E:** Emergency Response Plan during Construction	LSM

TABLE S-5 SUMMARY OF SIGNIFICANT IMPACTS

Impact Summary	No Project Alternative	Conventional BART Project	DMU Alternative	EMU Option	Express Bus/BRT Alternative	Enhanced Bus Alternative	Mitigation Measure Title	Impact Significance after Mitigation
Impact PHS-2: Physically interfere with an adopted emergency response or evacuation plan during construction		✓	✓	✓	✓		See **Mitigation Measure TRAN-1** (above)	LSM
3.O COMMUNITY SERVICES								
Impact CS-1: Need for new or physically altered governmental facilities to maintain acceptable service ratios, response times, or other performance objectives for police, fire, and emergency response during construction		✓	✓	✓	✓		See **Mitigation Measure TRAN-1** (above)	LSM
3.P UTILITIES								
Impact UTIL-1: Substantially disrupt utility services, including power, natural gas, communications, drinking water supplies, wastewater transport, or stormwater transport, during construction activities		✓	✓	✓	✓		**UTIL-1.A:** Restrict Service Interruptions to Off-Peak Periods **UTIL-1.B:** Arrange Temporary Backup Service **UTIL-1.C:** Notify Customers of Service Interruptions	LSM

Notes: LSM=Less-than-Significant impact with mitigation; S=Significant impact of No Project Alternative (mitigation is inapplicable); SU=Significant and unavoidable, even with mitigation or no feasible mitigation available.
DMU = diesel multiple unit; EMU = electrical multiple unit; BRT = bus rapid transit; LOS = level of service; USFWS = United States Fish and Wildlife Service; CTS = California tiger salamander; CRLF = California red-legged frog; BUOW = burrowing owl; SJKF = San Joaquin kit fox; NO_X = nitrogen oxides; PM = particulate matter; ROG = reactive organic gas; BAAQMD = Bay Area Air Quality Management District; TAC = toxic air contaminant; $PM_{2.5}$ = fine particulate matter less than 2.5 microns in diameter; GHG = greenhouse gas.