LIVERMORE AMADOR VALLEY TRANSIT AUTHORITY

STAFF REPORT

SUBJECT: Approval of Tri-Valley Hub Network Integration Study

FROM: Tony McCaulay, Director of Planning and Marketing

DATE: June 7, 2021

Action Requested
The Project & Services Committee recommends that the LAVTA Board approve the Tri-Valley Hub Network Integration Study and authorize the Executive Director to forward the study to the California State Transportation Agency (CalSTA).

Background
The Tri-Valley Hub Network Integration Study (Study) was 100 percent funded through a $500,000 grant award from the California State Transportation Agency (CalSTA) as part of the 2018 Transit and Intercity Rail Capital Program ('TIRCP'). The grant award also included $20,000,000 in state funds to increase the parking capacity at the Dublin/Pleasanton BART Station via construction of a new parking garage.

In May 2019, the LAVTA Board awarded a contract to AECOM Technical Services, Inc. to complete the study. AECOM's Justin Fox led the study team. Keith Whalen with the Ascendal Group served as Project Manager on behalf of LAVTA.

Discussion
The goal of the Study was to provide the strategic and technical requirements to move forward toward initiating future regional transportation services via a hubbed model at the Dublin/ Pleasanton BART Station and for the near-term evolution of that station into the Tri-Valley Hub as envisioned in the 2018 California State Rail Plan.

The Study began in October 2019 with the formation of a Technical Advisory Committee (TAC) comprised of staff from more than 15 agencies, organizations and cities located in the project area. The TAC met four times beginning in November 2019 to provide guidance and feedback on matters such as identification of the preferred hub location, operational alternatives and potential capital improvements. The first two meetings were held in person, while the final two meetings were conducted remotely due to the pandemic. The TAC reviewed and provided feedback on four technical memoranda as well as the draft and final reports.

Among the Study's conclusions:

- Move forward with implementing I-680 Express Bus service between Martinez and the Tri-Valley Hub, i.e. Dublin/Pleasanton BART
- Establish a governance structure
- Secure an operator and a funding source
- Work with operators at Dublin/Pleasanton BART to build consensus on improvements enhancing the facility's ability to serve as a successful Tri-Valley Hub

Fiscal Impact
None at this time.

Recommendation
The Project & Services Committee recommends that the LAVTA Board approve the Tri-Valley Hub Network Integration Study and authorize the Executive Director to forward the study to the California State Transportation Agency (CalSTA).

Attachments:

1. Draft Resolution 16-2021 Approving the Tri-Valley Hub Network Integration Study
2. I-680 Express Bus and Tri-Valley Hub Network Integration Study

Approved: _____

Attachment 1

RESOLUTION 16-2021

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE LIVERMORE AMADOR VALLEY TRANSIT AUTHORITY APPROVING THE TRI-VALLEY HUB NETWORK INTEGRATION STUDY

WHEREAS, the California State Transportation Agency ('CalSTA') awarded $500,000 to LAVTA to complete a study of incorporating megaregional bus services into the needs of the capacity expansion at the Dublin/Pleasanton BART Station and achieving key state strategic goals for a future 'Tri-Valley Hub' as outlined in the 2018 California State Rail Plan; and

WHEREAS, LAVTA engaged the services of a qualified consulting firm AECOM Technical Services, Inc. to develop the Tri-Valley Hub Network Integration Study; and

WHEREAS, a Technical Advisory Committee comprised of representatives of more than 15 governmental agencies and organizations in the project study area participated in the development and review of the study's recommendations; and

WHEREAS, the Tri-Valley Hub Network Integration Study Final Report has been completed and presented to the LAVTA Board of Directors.

NOW, THEREFORE BE IT RESOLVED, by the Board of Directors of the Livermore Amador Valley Transit Authority that the LAVTA Board approves the Tri-Valley Hub Network Integration Study Final Report and authorizes the Executive Director to forward the report to the California State Transportation Agency.

PASSED AND ADOPTED this 7th day of June 2021.

_____
Bob Woerner, Chair

Attest: _____
Michael Tree, Executive Director

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Attachment 2

Tri-Valley Hub Network Integration Study Final Report

Livermore Amador Valley Transit Authority (LAVTA)

May 27, 2021

Tri-Valley Hub Network Integration Study Final Report

Prepared by Livermore Amador Valley Transit Authority (LAVTA)

May 27, 2021

Executive Summary

The 2018 *California State Rail Plan* envisions a network of high-speed, intercity corridor, and commuter trains integrated with local transit, providing nearly seamless connections for riders seeking to reach all parts of the state. In corridors where no trains operate, the Rail Plan calls for express buses using the existing highway systems to provide access to the state's rail system. The Rail Plan identified the I-680 corridor between the Tri-Valley area (i.e. Dublin, Pleasanton, and Livermore) and Suisun City as one such corridor, where express buses could link a Tri-Valley Transit Hub with the Suisun-Fairfield Amtrak Station, a stop for the *Capitol Corridor* trains.

This Tri-Valley Hub Network Integration Study is an effort to define what such express bus service would be: its route, stops, connections with corridor and commuter trains, as well as its likely ridership, revenue, and costs for implementation. The study investigates the BART Dublin/Pleasanton BART station as a candidate for the Tri-Valley Transit Hub, along with potential improvements that could make the facility easier, safer, and more comfortable for riders to use. The study also explores options to better connect northern San Joaquin County communities with the Tri-Valley Hub.

The distance between the Suisun Amtrak Station and the Dublin/Pleasanton BART Station is 53 miles, inclusive of a stop at the Martinez Amtrak Station. An express bus route would consist of I-680 between Dublin/Pleasanton and Cordelia Junction, and then I-80 and SR 12 between Cordelia Junction and Suisun City. Intermediate stops could include Bollinger Canyon Park-and-Ride (access for the Bishop Ranch office complex), Walnut Creek BART, and the Martinez Amtrak Station. The weekday-only service would extend to the Altamont Corridor Express (ACE) commuter rail station in Pleasanton during the commute period. The service could use I-680 Express Lanes and thus circumvent some of the chronic congestion on the corridor.

Existing and Future Conditions

The corridor includes some of the fastest growing residential areas and job centers in Alameda and Contra Costa counties. While transit service serves the corridor's mainline rail stations in Pleasanton, Martinez, and Suisun, there is no single service linking the endpoints of the corridor, i.e. the Tri-Valley area and Suisun City. Nor is there a single service linking the Tri-Valley with the Martinez Amtrak Station, a stop for both the *Capitol Corridor* and *San Joaquins* trains.

Tri-Valley and I-680 corridor population and employment are expected to continue their growth trends well into the future, thus spurring demand for transit options inclusive of an I-680 Express Bus service. Also, Valley Link, a new regional rail service between North Lathrop, Tracy, and Dublin/Pleasanton BART, will begin operations within the next 10 years. As a result, the Dublin/Pleasanton BART Station will likely see increased usage as the future unfolds.

Proposed Bus Service and Improvements

The narrative that follows outlines a concept of operations for an I-680 Express Bus service. The service's start date would be in 2022. Buses would operate on roughly hourly headways. First-year ridership may reach almost 1,000 riders on weekdays. At startup, Martinez Amtrak could serve as the northern terminus, providing access the state-sponsored corridor trains. In later years, with the buildout of the Sonoma-Marin Area Rail Transit (SMART) commuter rail system to Suisun, the service could be extended to Suisun Amtrak to connect with SMART. While the Express Buses could use low mileage, used conventional diesel buses at startup to minimize costs, the service could transition in later years to zero-emissions, hydrogen-powered fuel cell buses. Later years would see more service frequency as well. The Express Bus service would have its own identity (logo and bus paint scheme), separate from existing transit operators on the corridor, and its own governance structure. The Express Buses would need berthing space at the Dublin/Pleasanton BART Station. Existing users at this future Tri-Valley Hub will likely need to ramp up service to keep pace with the demand triggered in part by area growth. Also, while the vast majority of Valley Link riders will make transfers to BART, there will be some who will seek to access work centers in Dublin and Pleasanton. Accordingly, local transit will need to provide last-mile connectivity.

There are opportunities at the present facility to build more bus bays, as the need arises. Electronic wayfinding signs can be installed to provide riders alighting buses with the latest departure information of BART and Valley Link trains. Autonomous vehicle (AV) shuttles can be deployed for improved circulation within the Tri-Valley Hub as well as link the facility with nearby

stores, shopping centers, and office complexes. Bicycle and scooter storage can be expanded easily at the entrances to BART and Valley Link. Lastly, more sidewalk covers can be constructed, protecting pedestrians from sun and rain.

Next Steps

Next steps for the Express Bus service include securing a funding source for implementation and covering ongoing subsidies, as revenues will be less than operating costs. Also, the service needs a governance structure, which could include the three service providers on the corridor today: Livermore Amador Valley Transit Authority (Wheels), Central Contra Costa Transit Agency (County Connection), and the Solano Transportation Authority (SolanoExpress).

As for Tri-Valley Hub improvements, BART can work with the other operators at the facility, as well as with the local jurisdictions (cities of Dublin and Pleasanton), to determine the most relevant enhancements as usage grows over time.

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List of Acronyms and Abbreviations

Acronym	Full Name
AADT	Annual Average Daily Traffic
ABAG	Association of Bay Area Governments
AC Transit	Alameda-Contra Costa Transit District
ACE	Altamont Corridor Express
ACS	American Community Survey
ADA	Americans with Disabilities ACT of 1990
Alameda CTC	Alameda County Transportation Commission
Alameda GSA	Alameda General Services Administration
AV	Autonomous Vehicles
BART	Bay Area Rapid Transit District
CalSTA	California State Transportation Authority
Caltrans	California Department of Transportation
CCTA	Contra Costa Transportation Authority
CCCTA	Central Contra Costa Transit Agency aka County Connection
CCD	Census County Division
CCJPA	Capitol Corridor Joint Powers Authority
CIP	Capital Improvement Plan
COVID-19	Coronavirus Disease 2019
CSRP	California State Rail Plan
DMU	Diesel Multiple Unit
DTC	Downtown Transit Center (Stockton)
EB	Eastbound
EMU	Electric Multiple Unit
EV	Electric Vehicle
FAST	Fairfield and Suisun Transit
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	Fiscal Year
GHG	Greenhouse Gas
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
ITS	Intelligent Transportation Systems
JPA	Joint Powers Authority
LAVTA	Livermore Amador Valley Transit Authority (Wheels)
MAX	Modesto Area Express
MPH	Miles per Hour
MTC	Metropolitan Transportation Commission
NB	Northbound
O&M	Operations and Maintenance
PCC	Portland Concrete Cement
PCTPA	Placer County Transportation Planning Agency

PDA	Priority Development Area
PM	Post Mile
PMT	Passenger Miles Traveled
PNR	Park-and-Ride
RTD	San Joaquin Regional Transit District
RTP	Regional Transportation Plan
SacRT	Sacramento Regional Transit District
SAV	Shared Autonomous Vehicles
SB	Southbound
SB1	Senate Bill 1
SCS	Sustainable Communities Strategy
SGR	State of Good Repair Program
SJCOG	San Joaquin Council of Governments
SJJPA	San Joaquin Joint Powers Authority
SMART	Sonoma Marin Area Rail Transit District
SolTrans	Solano County Transit
Soscol TC	Soscol Gateway Transit Center
SRTP	Short Range Transit Plan
STA	Solano Transportation Authority
STA	State Transit Assistance Program
StaRT	Stanislaus Regional Transit
TAC	Technical Advisory Committee
TIRCP	Transit and Intercity Rail Capital Program
TNC	Transportation Network Company
TOD	Transit Oriented Development
TTC	Tracy Transit Center
VINE	Valley Intercity Neighborhood Express
VMT	Vehicle Miles Traveled
VTA	Santa Clara Valley Transportation Authority
WB	Westbound
WestCAT	Western Contra Costa Transit Authority
YCTD	Yolo County Transportation District
YOE	Year of Expenditure

Introduction

The Tri-Valley Hub Network Integration Study has two purposes. First is to define a concept for an Express Bus service linking a proposed Solano County Transit Hub with a proposed Tri-Valley Transit Hub running along the I-680 corridor, The concept for a hub-to-hub Express Bus service was articulated in the 2018 *California State Rail Plan* as a means to provide residents in the Tri-Valley (the general Pleasanton, Dublin, San Ramon and Livermore area) better access to the state's rail system, i.e. the *Capitol Corridor* and the *San Joaquins* corridor rail services. The analysis assumes that the location of the Solano County hub would be the Suisun-Fairfield Amtrak [1] Station. It also identifies the Bay Area Rapid Transit District's (BART) Dublin/Pleasanton Station as the site of the Tri-Valley Hub.

The other purpose of the analysis was to envision improvements at the Dublin/Pleasanton BART Station which would enable the facility to better fulfill its future role as the Tri-Valley Transit Hub:

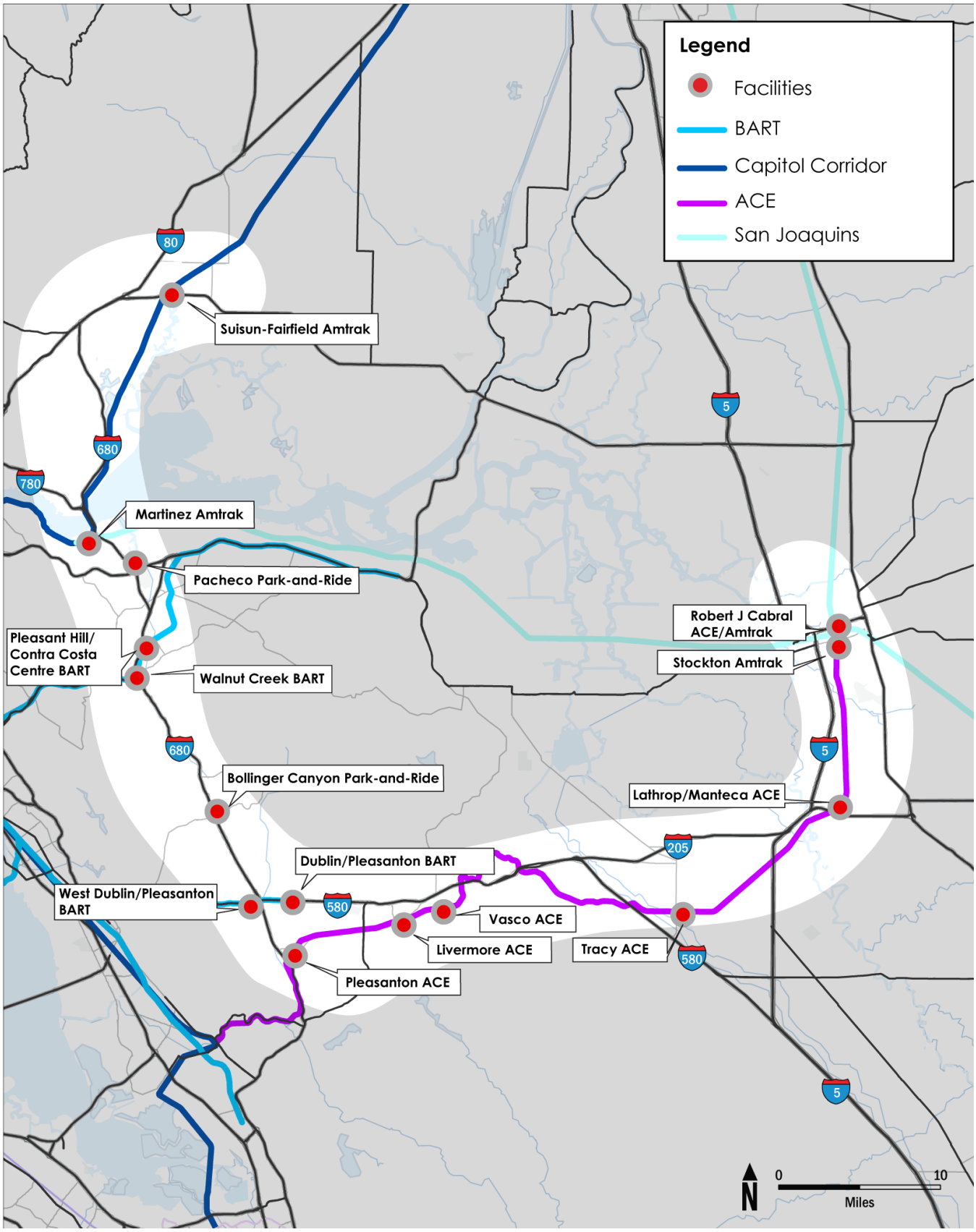
The analysis pursues these purposes through the following chapters.

- Chapter 1 defines existing conditions in the I-680 corridor relevant to an Express Bus service and a Tri-Valley Hub.
- Chapter 2 assess future conditions, including the express lane network and population and employment forecasts, pertaining to the I-680 corridor.
- Chapter 3 identifies the needs of facilities along the corridor which could serve as stops for the I-680 Express Bus service,
- Chapter 4 evaluates candidates for the Tri-Valley Hub and names a preferred hub location, i.e. the Dublin/Pleasanton BART Station.
- Chapter 5 forecasts ridership for an I-680 Express Bus service.
- Chapter 6 articulates a conceptual service plan for the Express Buses, inclusive of schedules, revenues, costs, required subsidies, funding sources, and options for governance.
- Chapter 7 envisions various improvements that could be implemented to enable the Dublin/Pleasanton BART Station to become an effective transit hub.

The study area is shown in **Figure 1**.

[1] Amtrak's formal name is the National Rail Passenger Corporation. Amtrak operates its own long-distances services as well as providing crews for the Capitol Corridor and San Joaquins trains.

Figure 1. Study Area



Chapter 1 - Existing Conditions

This chapter has several parts that altogether point to the feasibility of an I-680 Express Bus service on the I-680 corridor. First, existing I-680 corridor conditions, relevant to the establishment of an Express Bus service between Suisun and the Tri-Valley area, are described. These include traffic volumes, congestion, socio-economic data, transit services, and key transit facilities, among other things. Recent year studies pertaining to the corridor, along with ongoing transit programs and projects, are discussed.

Second, future conditions are noted, including the planned buildout of the corridor's express lane network, which the Express Bus service would use. Also, corridor travel demand forecasted by various sources are noted, as are forecasts of jobs and population in communities along the corridor.

Third, given the existing and future conditions, the service need that an Express Bus service in the corridor would fulfill is outlined.

Fourth, the needs of key corridor transit facilities, the potential termini and intermediate stops for an Express Bus service, are identified. These needs include street and highway access, parking, and bike storage – all of which are crucial in making the facilities attractive to patrons of the bus service.

Lastly, a high-level concept of an Express Bus service is outlined. The goals of such a service were noted in the 2018 *California State Rail Plan* over three-time horizons: the near-term (circa 2022), the mid-term (circa 2027), and the long-term (circa 2040). The concept identifies incremental improvements for the Express Bus service in terms of frequency and reach over the time period.

1.1 Existing Conditions

The study area includes the I-80/680/580 corridor from Suisun to the Tri-Valley area and on to Stockton. This section looks at the existing conditions in the study area from roadway performance, socioeconomics, transit services, and facilities along the corridor. It also includes previous related studies, along with existing programs and projects.

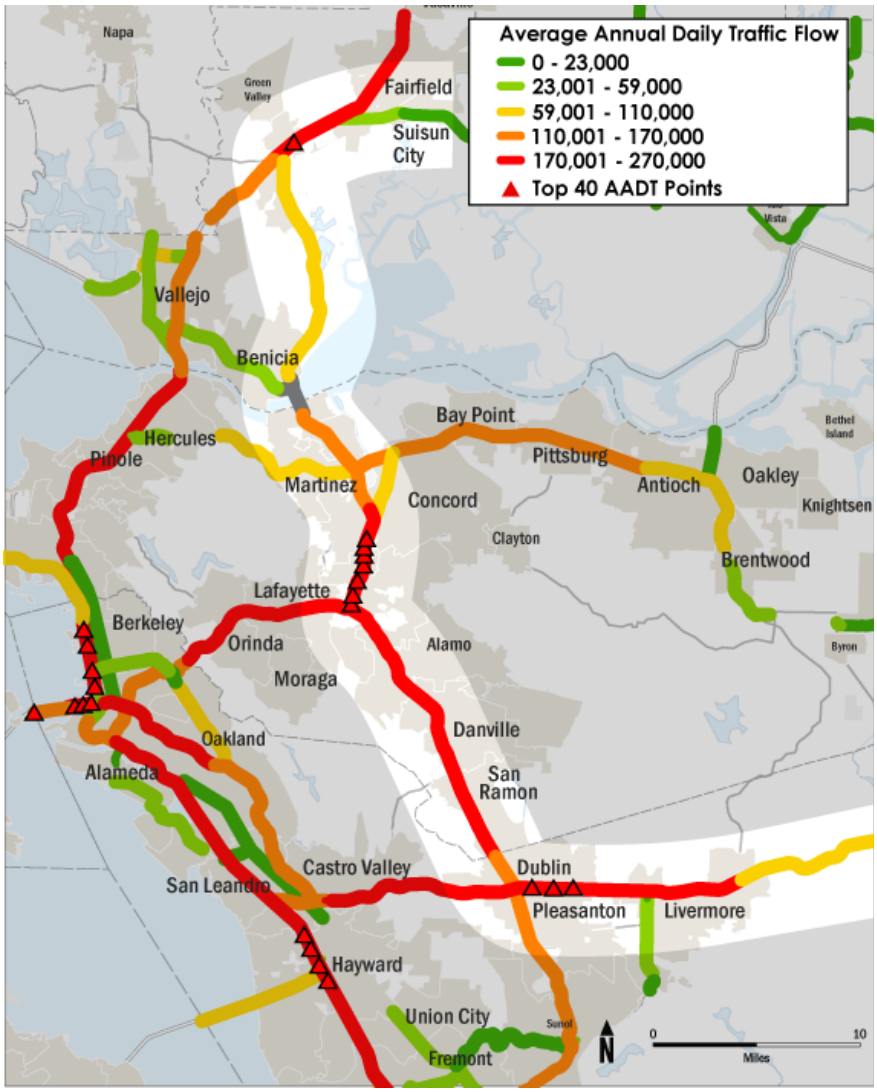
1.1.1 Roadway Performance

Roadway conditions in the study corridor have been analyzed in two ways: Annual Average Daily Traffic (AADT) counts and congestion levels. Each method is described in greater detail below.

Annual Average Daily Traffic Data

AADT counts are one of the primary ways Caltrans summarizes highway traffic volumes. These are daily traffic counts averaged over a one-year period. Sensors along the roadways count vehicles throughout the year, with each total divided by 365 days. **Figure 2** below shows a visual representation of the AADT data for the Northern California Megaregion. The data used to generate the map from Caltrans 2019; data is pre-COVID-19.

Figure 2. AADT Data in the Study Area



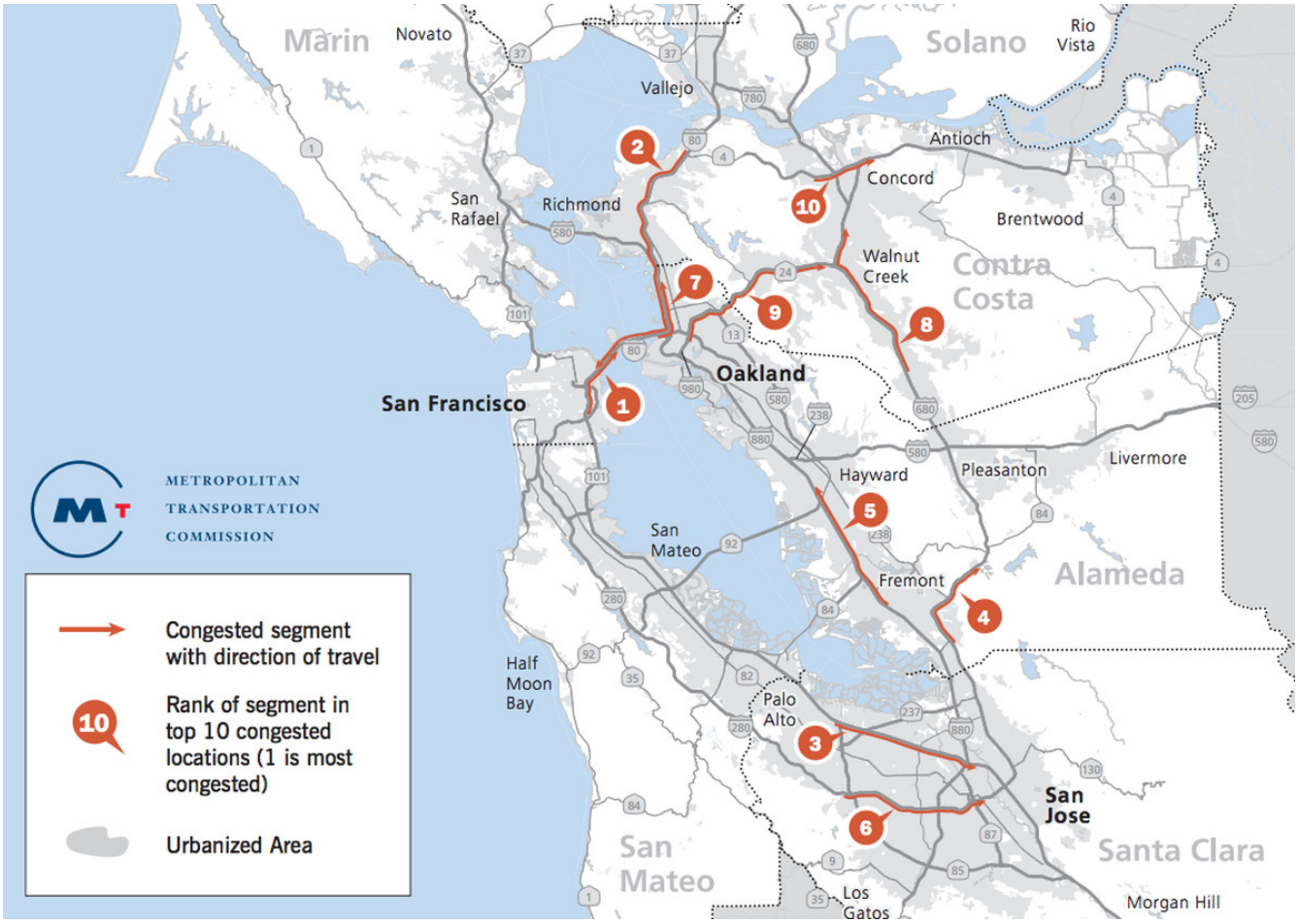
Source: AECOM, Caltrans 2019

The locations within the study area with the highest AADT counts are the stretch of I-680 between SR 24 and SR 242 near Walnut Creek, and on I-580 between Dougherty Road and Camino Tassajara in the Dublin/Pleasanton area. On I-80, Cordelia Junction, where I-80, SR 12 and I-680 split, is another notable point with high AADT counts.

Congestion Levels

Congestion levels in the Bay Area have been on an upward trend over the past decade, with Alameda County experiencing an 8.1 percent share of highway miles traveled in congestion and Contra Costa experiencing 6.7 percent. Alameda and Contra Costa counties have been experiencing above average miles of congestion in comparison to the nine-county Bay Area (5.8 percent). Congestion in this case is defined by the U.S. Department of Transportation, Caltrans, and Metropolitan Transportation Commission (MTC) as vehicle miles traveled (VMT) on a freeway in 35 miles per hour (mph) conditions or slower. **Figure 3** below shows a map of the MTC region's 10 most congested segments. The segment of I-680 between Pleasant Hill and San Ramon is ranked eighth in the region and is at the center of the study corridor.

Figure 3. Top Ten Congested Segments in the MTC Region



Source: MTC Vital Signs

1.1.2 Socioeconomic Data

Socioeconomic data are statistics that cover economic and social activity and the relationship between them. This section covers demographic information, county-to-county commute flows, historical job and population growth, and housing stock in the corridor area.

Demographics

The demographics data gathered on the corridor covers age, income, race, ethnicity, and gender. The majority of people in the corridor area are between the ages of 30 and 54, have a monthly income above $3,333, are predominantly white and Asian, and are slightly majority male. The full demographics dataset can be seen in detail in **Appendix A.** Data is from the American Communities Survey (ACS) [2] from 2017.

County-to-County Flows

The county pairs in the study area with the heaviest commuter county-to-county flows are between Contra Costa and Alameda, between Alameda and Santa Clara, and between Solano and Contra Costa**. Table 1** shows daily county-to-county commute flows with the county of origin listed across the top and the destination county listed on the left. The values in each cell are colored with green representing the highest and yellow representing the lowest. The data is from the California Employment Development Department, with the latest data set available from 2010. While the data is 10 years old, the overall commute patterns are not likely to have radically changed over the last decade, as housing and job centers have not

[2] The American Community Survey is an ongoing survey conducted by the US Census Bureau. While the Census is conducted in full every 10 years, the ACS is conducted yearly, making trends easier to follow

shifted much. The strongest origin-destination pair is commuters originating in Contra Costa County and commuting to Alameda County.

Table 1. Daily County-to-County Flows

		Origin				
Destination	County	Solano	Contra Costa	Alameda	San Joaquin	Santa Clara
	Solano		7,442	1,774	1,041	376
	Contra Costa	19,903		39,883	5,377	3,360
	Alameda	11,723	92,797		26,121	38,339
	San Joaquin	497	1,903	1,856		497
	Santa Clara	1,493	11,526	64,696	7,954	

Source: California Employment Development Department

Historical Jobs and Population Growth

The total number of jobs in the study area has increased greatly over the last decade, with most of that growth concentrating in regional work centers. The cities analyzed in the corridor are listed below in **Table 2,** with the data summarized in the following sub-sections. The colors range from yellow to green, with green indicating higher growth and yellow indicating lower growth. The full data set can be found in **Appendix A**.

Table 2. Historical Job and Population Growth 2007 to 2017

City	Total New Jobs	Percent Change	Population Change	Percent Change
Dublin	5,329	37%	17,366	40%
Pleasanton	8,664	15%	16,959	26%
Livermore	5,668	12%	11,315	14%
Suisun	-88	-3%	2,797	10%
Fairfield	2,378	6%	12,723	12%
Benicia	1,033	8%	2,165	8%
Martinez	-1,109	-5%	3,292	9%
Concord	1,719	3%	9,168	8%
Pleasant Hill	2,236	13%	2,809	9%
Walnut Creek	2,147	4%	6,779	11%
Danville	-65	-1%	-1,326	-6%
San Ramon	7,739	22%	27,251	56%
Stockton	8,240	8%	24,812	9%
Tracy	11,936	66%	11,816	15%
Manteca	2,891	21%	15,485	24%

Source: American Community Survey 2007-2017

Jobs

In the Tri-Valley area alone, an average of nearly 20,000 jobs were added from 2007 to 2017. The city with the largest percent increase in jobs is Dublin, which saw 37 percent growth. Pleasanton saw the largest increase in total new jobs, with an increase of 8,664 during the analysis time frame. According to ACS, the average rate of growth for the Tri-Valley from 2007 to 2017 was 1,966 jobs per year, or 1.6 percent annually. If these trends continue, the Tri-Valley will be home to 163,986 jobs by 2027 and 202,682 jobs by 2040.

The Solano County communities have seen a slower rate of growth than the other cities in the study area, with a total increase of 1,108 jobs. Fairfield added the most jobs overall, while Benicia saw the largest percent increase.

The Contra Costa County cities along the I-680 corridor added a total of 12,667 jobs. San Ramon experienced the greatest growth, adding over half of all new jobs in the region and seeing a total percent increase of 22 percent. This increase was due in large part to the presence of the Bishop Ranch office park (employs approximately 30,000 people). Conversely, Martinez saw a net loss of 1,109 jobs, more than any other city in the corridor.

The San Joaquin County cities in the study area saw enormous growth and had the most job growth in the entire study area. In total, 23,067 jobs were added along the I-580/I-205/I-5 corridor, with the most growth occurring in Tracy. Jobs in Tracy grew at a rate of 66 percent and totaled to nearly half of the new jobs in the corridor.

Job Concentrations and Work Centers

Based on the growth trends established in Table 2, it can be assumed that this increase in jobs will mean an increase in commuters and traffic on I-680 and I-580/I-205/I-5 corridors, as most job growth in the corridor is occurring in communities along these highways. On the following two pages, **Figure 4** and **Figure 5** are concentration maps of jobs per square mile along the corridor. The largest concentrations of jobs in the western portion of the corridor (I-680) are clustered primarily in Pleasanton, San Ramon, Walnut Creek, and Concord. In the eastern portion of the corridor (I-205 and I-5) jobs are clustered primarily in Stockton and Tracy.

Population

In the Tri-Valley, Dublin is the fastest growing city in terms of new residents and overall percent change in population. Pleasanton added almost as many residents as Dublin over the same time span.

Solano County cities saw the least amount of population growth overall. The majority of all growth along the I-80 corridor was concentrated in Fairfield.

San Ramon experienced the most growth in Contra Costa County along the I-680 corridor.

The city with the greatest percent increase in population in San Joaquin County along the I-580/I-205/I-5 corridor was Manteca, while Stockton saw the largest absolute increase in overall population.

Figure 4. Job Concentrations Along the Corridor – West

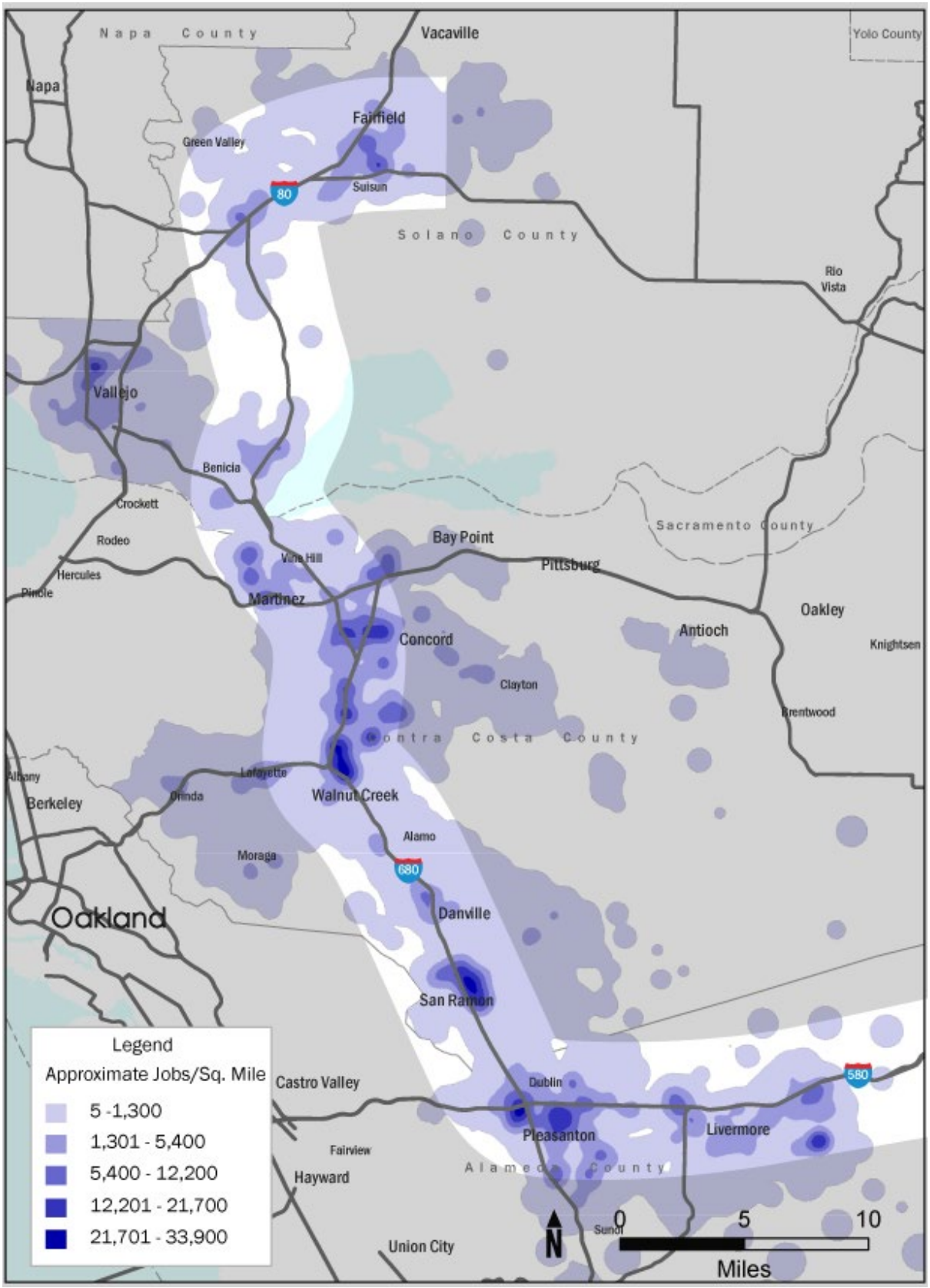
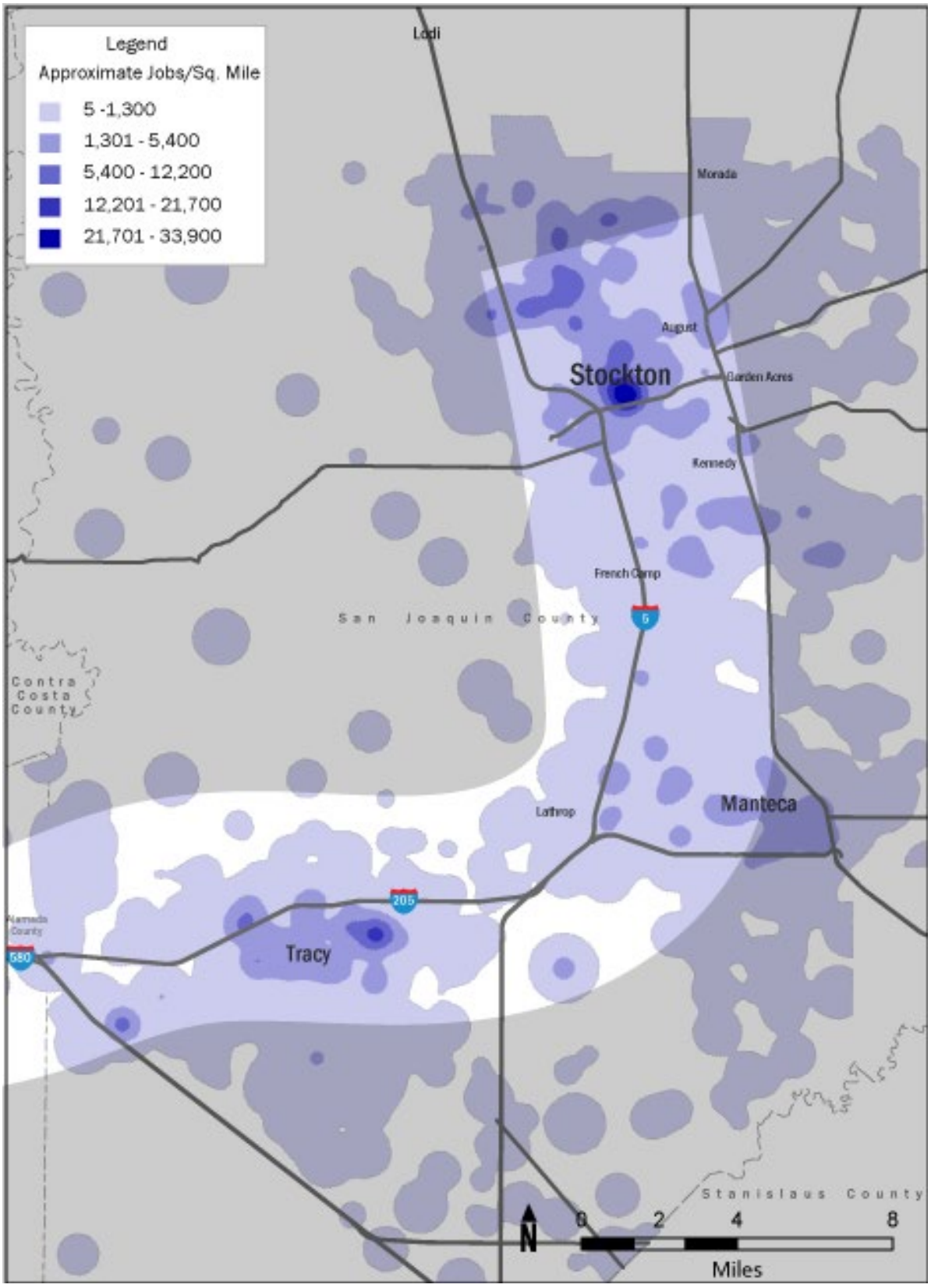


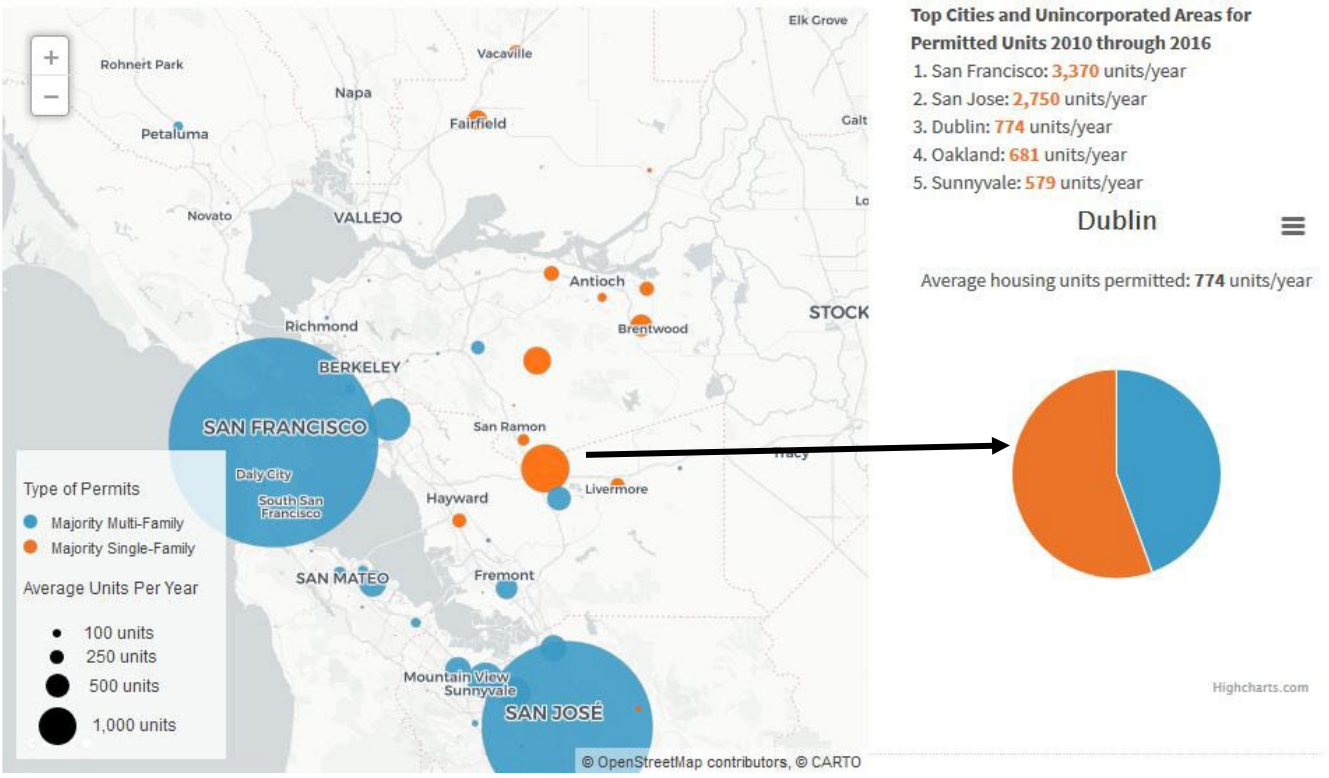
Figure 5. Job Concentrations Along the Corridor – East



Housing Stock

The Tri-Valley area is growing faster than any other region in the study area, as seen in **Figure 6**. Dublin has the third fastest growing housing stock in the nine-county Bay Area behind San Francisco and San Jose. Dublin is growing at a faster rate than Oakland, indicating a significant amount of growth in Alameda County is occurring in the Livermore-Pleasanton Census County Division (CCD), i.e. eastern Alameda County. According to the Association of Bay Area Governments (ABAG) data, 56 percent of issued housing permits are for single-family homes, and 44 percent are for multi-family homes (apartments, duplexes, etc.). While the Tri-Valley is growing, the rest of the I-680 corridor is not matching pace.

Figure 6. Bay Area Housing Stock Growth 2010 – 2016

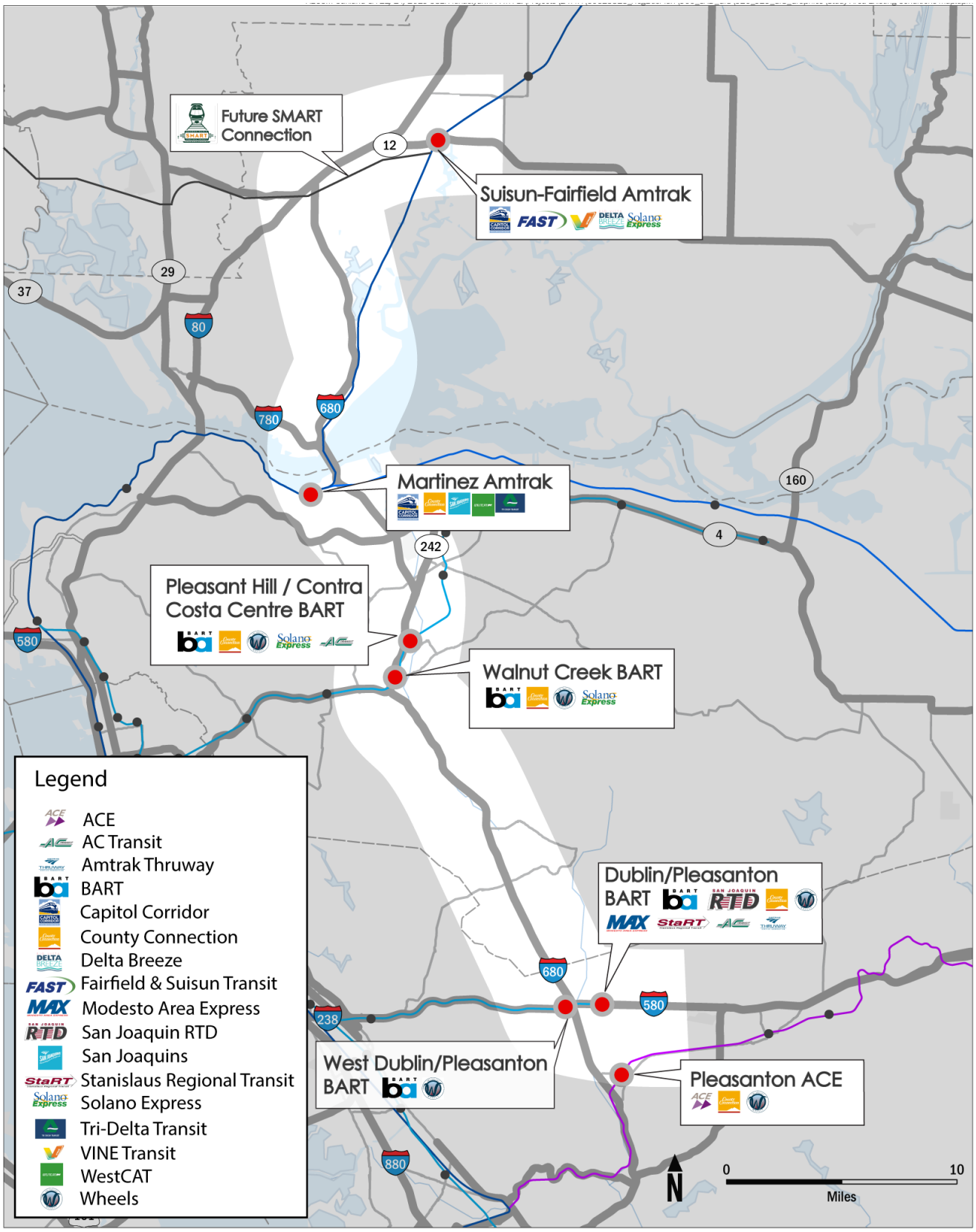


Source: MTC Vital Signs, ABAG Housing Permit Database (2014-2016)

1.1.3 Transit Connections

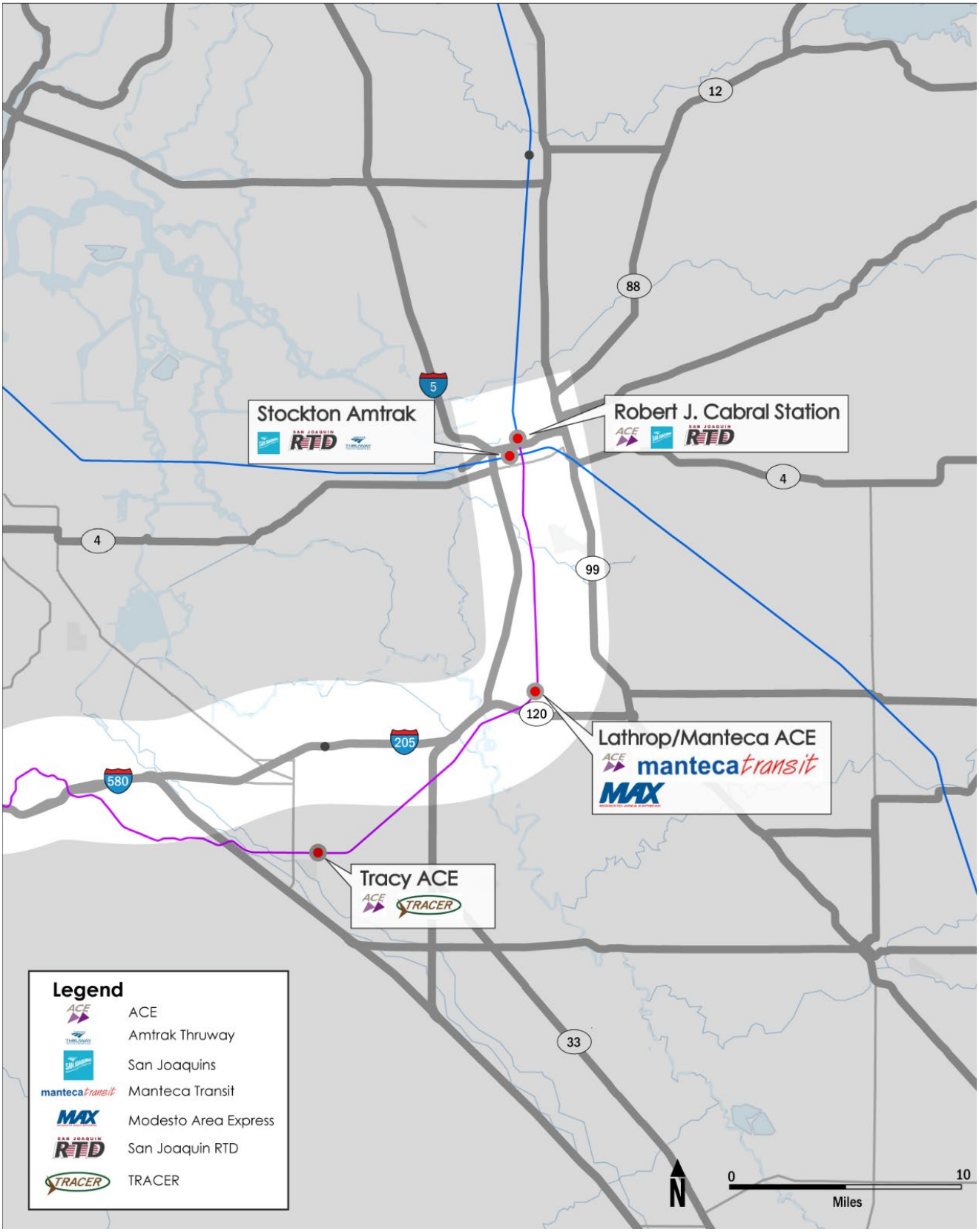
This section summarizes the transit and rail service operations as well as private employer shuttles in the study area and describes the routes that interact with the study corridors. **Figure 7** and **Figure 8** below show the corridors as well as the primary transit hubs and the service providers that stop at each location. The services listed and shown in the following figures are from pre-COVID-19 frequencies, routes, and service levels, and due to emergency and disaster response measures may not reflect the most current conditions.

Figure 7. Corridor Transit Map – West



Source: AECOM

Figure 8. Corridor Transit Map – East



Source: AECOM

SolanoExpress

The SolanoExpress is an intercity bus service managed by the Solano Transportation Authority (STA) with individual routes operated by Fairfield and Suisun Transit (FAST) and Solano County Transit (SolTrans). SolanoExpress has three main routes that connect with the study area; these routes are listed below by operator. The full system map appears in **Appendix B.**

Solano Transit

- Red Line between Suisun Amtrak and El Cerrito del Norte BART with a connection to the Vallejo Ferry Terminal/Transit Center (Vallejo TC):
  - On weekdays the route runs from 4:30 AM to 11:45 PM primarily between El Cerrito del Norte BART and the Vallejo TC with a 15-minute frequency during the peak period and 20-minute frequency off-peak. The route only continues to Suisun Amtrak to meet hourly *Capitol Corridor* trains.
  - Saturday service runs from 6:30 AM to 11:30 PM with 30-minute frequency all day. Four trips northbound (NB) and four trips southbound (SB) connect with Suisun Amtrak, though only two connect with *Capitol Corridor* in each direction.
  - Sunday Service runs from 8:30 AM to 9:30 PM with an hourly frequency all day. The route runs between Vallejo TC and El Cerrito del Norte BART and makes no connection to Suisun.
- Yellow Line between Vallejo Ferry Terminal/Transit Center and Pleasant Hill/Contra Costa Centre Bay Area Rapid Transit (BART) and Walnut Creek BART:
  - On weekdays the service runs from 5:30 AM to 10:15 PM every 30 minutes in the peak period and hourly during the off-peak.
  - Saturday service runs from 6:20 AM to 10:00 PM with four trips in the morning and five trips in the evening.
  - Sunday service runs from 8:00 AM to 10:00 PM with three trips in the morning and five trips in the evening.

Fairfield and Suisun Transit

- Blue Line between Pleasant Hill/Contra Costa Centre BART and Sacramento Valley Station:
  - Weekday service runs from 5:30 AM to 8:30 PM with 30-minute frequency during the peak period and hourly frequency during the off-peak.
  - Saturday service runs from 8:00 AM to 7:40 PM with hourly frequency.
  - Note: STA has stated that in the near future the Blue Line will run from Walnut Creek BART to Sacramento Valley Station.
- Green Line between El Cerrito del Norte BART and Suisun Amtrak runs weekday service only from 4:10 AM to 9:20 AM and 2:00 PM to 8:20 PM with a 20-minute frequency.

County Connection

Central County Costa Transit Authority (CCCTA), also known as County Connection, is a major transit bus operator in Central Contra Costa County and heavily utilizes the I-680 corridor. Buses make stops at the Pleasanton Altamont Corridor Express (ACE) station, West Dublin / Pleasanton BART, Dublin/Pleasanton BART, Walnut Creek BART, Pleasant Hill/Contra Costa Centre BART, and Martinez Amtrak. The primary routes along the corridor are listed below. The County Connection service map is shown in **Appendix B**.

- 92X Pleasanton Livermore Altamont Corridor Express (ACE) to Bishop Ranch/San Ramon and Walnut Creek BART weekdays only from 5:30 AM to 6:15 PM with three buses in the morning and three in the evening; service approximately meets ACE trains.
- 95X Bishop Ranch/San Ramon to Walnut Creek BART, weekdays only from 6:00 AM to 9:00 AM and from 3:30 PM to 7:30 PM with a 20-minute peak-period frequency.
- 96X Bishop Ranch/San Ramon to Walnut Creek BART, weekdays only from 5:30 AM to 7:15 PM with 20-minute frequency.
- 97X Bishop Ranch/San Ramon to Dublin/Pleasanton BART, weekdays only with three buses from 6:30 AM to 9:00 AM and three buses 4:00 PM to 6:15 PM with hourly peak-period frequency.

- 98X Martinez Amtrak to Walnut Creek BART, weekdays only from 5:30 AM to 7:15 PM with 30-minute frequency during peak hours and hour frequency during off-peak.

Wheels

Operated by Livermore Amador Valley Transit Authority (LAVTA), Wheels is a bus transit service in the Tri-Valley. Routes that utilize the I-680 and I-580 corridors as well as the routes that serve regional rail stations are listed below. To provide regional context, the Wheels service map can be found in **Appendix B**.

- 10R Livermore ACE to Pleasanton ACE and West Dublin/Pleasanton BART, weekdays from 5:15 AM to 1:45 AM with 15-minute frequency; weekends from 6:00 AM to 1:45 AM with 30-minute frequency.
- 30R Livermore ACE to Dublin/Pleasanton BART and West Dublin/Pleasanton BART, weekdays from 5:00 AM to 12:45 AM with 15-minute frequency; weekends from 5:00 AM to 12:45 AM with hourly frequency.
- 20X Livermore ACE to Vasco Road ACE and West Dublin/Pleasanton BART, weekdays only with two morning trips at 7:30 AM and 8:30 AM and two evening trips at 4:45 PM and 5:45 PM.
- 70X Dublin/Pleasanton BART to Walnut Creek BART and Pleasant Hill/Contra Costa Centre BART, weekdays only from 5:45 AM to 9:00 AM and 4:00 PM to 7:15 PM with 30-minute frequency.
- 580X Livermore ACE to West Dublin/Pleasanton BART, weekdays only, from 6:00 AM to 8:30 AM and 4:30PM to 7:30 PM with 30-minute frequency.
- 53 Pleasanton ACE to West Dublin/Pleasanton BART, weekdays from 5:30 AM to 8:30 AM and 4:00 PM to 7:15 PM with roughly hourly frequency; weekends with two trips in the morning and two trips in the evening.
- 54 Pleasanton ACE to West Dublin/Pleasanton BART, weekdays only with two trips in the morning and three trips in the evening; service meets ACE trains.

San Joaquin Regional Transit District

San Joaquin Regional Transit District (RTD) is the primary transit provider for the Stockton Area and one of the main transit providers in San Joaquin County. The main route in the study area is Route 150: a BART commuter-oriented route from the Stockton Downtown Transit Center to the Dublin/Pleasanton BART Station, making stops in Lathrop and Tracy along the way. Route 150 operates morning and afternoon trips on weekdays. On weekends there are two buses in the morning, one bus mid-day, and two buses in the evening.

Currently, Route 150 departure trip times are at 4:00 AM, 5:00 AM, 7:00 AM, and 3:00 PM from the Downtown Transit Center (DTC) in Stockton. Return departure times are 6:15 AM, 7:15 AM, 9:15 AM, 4:30 PM, 5:30 PM, and 6:30 PM from the Dublin/Pleasanton BART Station. There is running time built in the route trip to account for possible traffic delays and ensure on-time arrivals and connections to BART trains.

Western Contra Costa Transit Authority

Western Contra Costa Transit Authority (WestCAT) serves the northwestern region of Contra Costa County and operates one route that connects with the study area: Route 30Z from the Hercules Transit Center to Martinez Amtrak Station by way of SR 4. Route 30Z runs weekdays only from 6:30 AM to 7:30 PM every 30 minutes during the peak period and every hour during the off-peak.

Tri-Delta Transit

Tri-Delta Transit is the primary transit provider in northeastern Contra Costa County; it has two routes that connect to the study area:

- Route 200 between Pittsburg/Bay Point BART and Martinez Amtrak operates weekdays only from 6:45 AM to 6:00 PM.
- Route 201 between Pittsburg/Bay Point BART and Concord BART operates weekdays only from 5:00 AM to 8:00 PM with service every 30 minutes during the peak periods and hourly during the off-peak.

Valley Intercity Neighborhood Express

The Valley Intercity Neighborhood Express (VINE) operates primarily in Napa County. The main transit hub for VINE is the Soscol Gateway Transit Center (Soscol TC), centrally located in in downtown Napa. The majority of the VINE regional and

local routes make stops at the Soscol TC. Route 21 connects the Soscol TC with Suisun Amtrak. Soscol TC also has an Amtrak Thruway bus connection with Martinez Amtrak Station [3]. The service operates with hourly frequency weekdays only from 6:15 AM to 7:00 PM.

Delta Breeze

Rio Vista Delta Breeze is a small transit agency that serves Rio Vista operated by the company Transportation Concepts. The services offered are deviated fixed route service that comes to the rider's door and connects with the Suisun City and will stop at Suisun Amtrak Station upon request.

Stanislaus Regional Transit

The Stanislaus Regional Transit (StaRT) route "Commuter" connects Turlock and Patterson to the Dublin/Pleasanton BART Station. It leaves Turlock in the morning at 4:15 AM and arrives at BART at 6:10 AM, and in the evening it leaves BART at 4:45 PM and arrives in Turlock at 6:45 PM. The service is weekdays only.

Alameda-Contra Costa Transit District

Alameda-Contra Costa Transit District (AC Transit) operates primarily in the western part of Alameda county and has two routes that interact with the study corridor (note: routes operate in the mornings only):

- Route 702 between Pleasant Hill/Contra Costa Centre BART and the Salesforce Transit Center weekdays only, departing Pleasant Hill/Contra Costa Centre BART every 15 minutes from 4:00 AM to 4:30 AM.
- Route 703 between Dublin/Pleasanton BART and the Salesforce Transit Center weekdays only, departing from Dublin/Pleasanton BART every 15 minutes from 4:00 AM to 4:30 AM.

Modesto Area Express

The Modesto Area Express (MAX) is the primary transit service provider for the Modesto urban area. MAX operates one route that utilizes the study area corridor:

- MAX to BART runs between the Modesto Downtown Transportation Center and Dublin/Pleasanton BART. It operates weekdays approximately hourly from 4:30 AM to 12:55 PM and 3:45 PM to 8:10 PM.

Greyhound Inc.

Greyhound is a private intercity bus service that operates on the I-80 corridor. Greyhound makes stops at the Vallejo Transit Center and the Suisun Amtrak Station.

Amtrak Thruway

Amtrak Thruway buses make a connecting stop at Martinez and Suisun Amtrak stations. They continue on to Stockton Amtrak Station and Arcata. Thruway services associated with *Capitol Corridor* connect to Napa and Petaluma.

FlixBus

FlixBus is a private intercity bus service. Buses operate on I-80 between San Francisco and Sacramento with a stop at the Vallejo Transit Center. Buses also link San Francisco, Oakland, and Stockton.

Employer Shuttles

Employer shuttles make stops along the corridor as well, though the exact company names, stop locations, and schedules are not publicly available. Shuttles commonly utilize transit hubs and park-and-rides to pick up and drop off employees.

Rail Services

Capitol Corridor

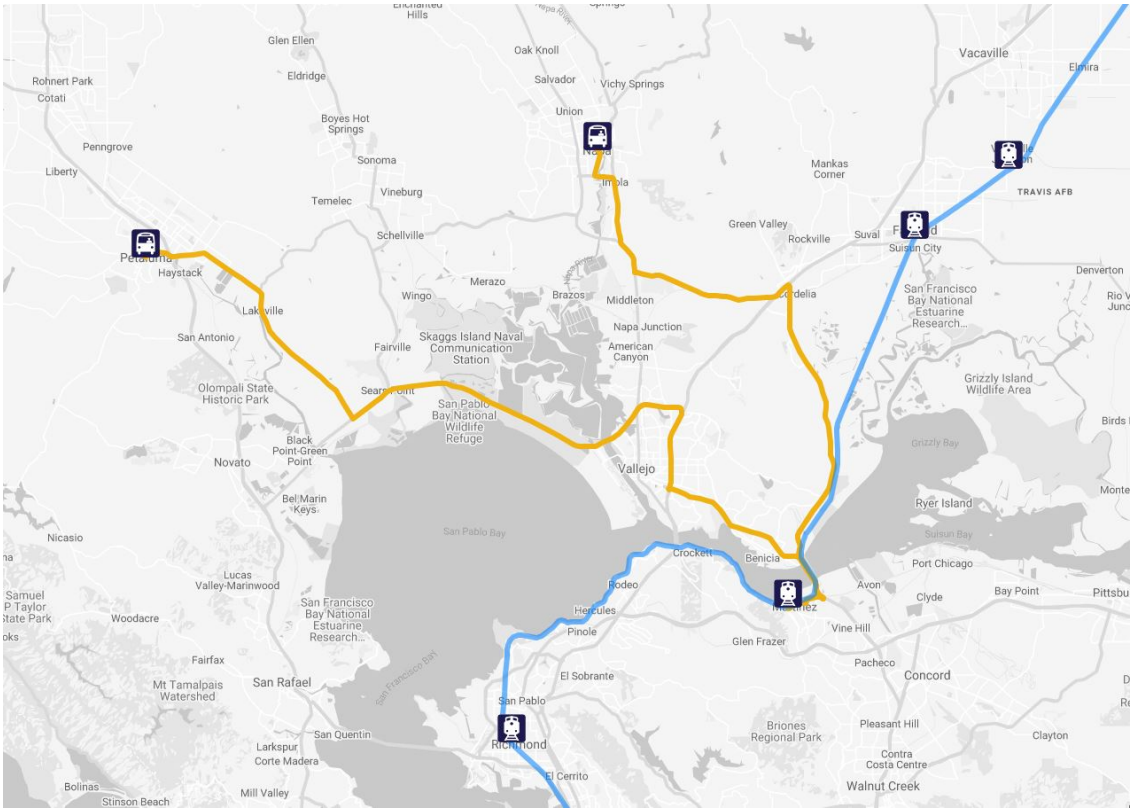
Operated by the Capitol Corridor Joint Powers Authority (CCJPA), *Capitol Corridor* trains runs through the study area with stops at Martinez Amtrak and Suisun Amtrak. The entire service route runs between San Jose and Auburn, though most trains do not originate or terminate beyond Sacramento. On weekdays 15 daily round trips operate in the study area, with 11

[3] Amtrak Thruway buses connect with Amtrak intercity and corridor trains, including Capitol Corridor and San Joaquins trains, to provide Amtrak patrons with connections to off-line origins and destinations.

daily round trips on weekends. The service map for operations in the study area is show below in **Figure 9**. The blue line shows the *Capitol Corridor* rail service, and the yellow lines show connecting Amtrak Thruway bus services.

Amtrak Thruway buses meet *Capitol Corridor* trains at Martinez and connect riders with Petaluma and Napa. Delta Breeze operates the Amtrak Thruway Bus connection to Rio Vista. Transit services that stop at Martinez Amtrak include County Connection, Tri-Delta Transit, and WestCAT.

Figure 9. Capitol Corridor Service Map and Supporting Thruway Bus Service to Napa and Petaluma



Source: Capitol Corridor

San Joaquins

Operated by the San Joaquin Joint Powers Authority (SJJPA), the *San Joaquins* trains run between Oakland and Bakersfield and between Sacramento and Bakersfield, with the confluence of its two routes in Stockton. At Stockton, five round trips connect to Oakland and two connect to Sacramento. In the study area *San Joaquins* trains stop in Martinez and Stockton.

Bay Area Rapid Transit

BART is a heavy rail urban mass transit system, operating with frequent headways. BART has two lines that interact with the study area corridor: The Blue Line to Dublin/Pleasanton and the Yellow Line to Antioch.

Altamont Corridor Express

ACE is a commuter rail service that runs from Stockton to San Jose over Altamont Pass and through the Tri-Valley. In the study area, ACE makes stops in Stockton, Lathrop/Manteca, Tracy, Pleasanton, and Livermore (including Vasco Road). On weekdays, ACE runs four daily round trips in the peak direction only (four trips from Stockton to San Jose in the morning and the reverse in the evening). In September of 2019 ACE service expanded to include Saturdays with two westbound (WB) trips in the morning and two eastbound (EB) trips in the evening.

Amtrak Long-Distance Services

Amtrak long-distance intercity services touch on the I-680 corridor at the Martinez Amtrak Station. These services are the Emeryville-to-Chicago *California Zephyr* and the Los Angeles-to-Seattle *Coast Starlight*. Each train operates one round trip daily.

1.1.4 I-680 Corridor Transit Facilities

Noted below are descriptions of key transit facilities in the study area which may become stops and termini for an I-680 Express Bus service.

Suisun-Fairfield Amtrak Station

A bus island and turnaround area for this station are located directly adjacent to the Suisun Amtrak Station ticket office and platform. Parking for the station is located across the street at the Suisun-Amtrak Park-and-Ride, which contains 256 parking spaces. Buses access the east side of the bus island at the Suisun Amtrak Station by entering west onto Railroad Avenue from Main Street. The bus island is approximately 200 feet long, providing space for approximately three buses on either side of the island at once; it contains two bus shelters. A bus stop with a shelter is also present to the east of the station across Main Street, at the northeast corner of Main Street and Lotz Way.

The station is currently served by bus service from SolTrans (Route R), SolanoExpress (Red Line), FAST (Route 5), VINE Transit (Route 21), Delta Breeze Transit (Route 50), and Amtrak Thruway buses.

Martinez Amtrak Station

The parking lot adjacent to Amtrak station contains 136 parking spaces, and the overflow lot to the north (off Ferry Street) contains 175 spaces.

Buses access the station by entering the parking lot from Marina Vista Avenue. Bus stops are available on the perimeter of the parking lot on the north and south sides. There are four bus shelters and space for approximately five to six buses at one time. The station is served by Tri-Delta Transit, County Connection, and WestCAT routes.

Pleasant Hill/Contra Costa Centre BART Station

The station has a seven-story parking structure located to the north of the station that contains 2,937 parking spaces. There is a private surface parking adjacent to the station, as well as a private garage across Oak Road.

Buses access the station from Jones Road on the bus-only Coggins Drive, southeast of the BART station. There are 10 bus spaces on a bus island and 10 bus shelters.

The station is served by SolanoExpress, County Connection, and Wheels bus routes. Accommodating additional bus service will require coordination with BART.

Walnut Creek BART Station

Walnut Creek has 2,093 parking spots, eight bus bays, 72 protected bike lockers, and bike racks. The station is served by County Connection, Wheels, and SolanoExpress. The station can be accessed via North California Boulevard and via Ygnacio Valley Road adjacent to I-680. There is a public garage not affiliated with BART on the opposite side of North California Boulevard.

The station is located on the fringe of downtown Walnut Creek, with good transit connections and nearby walkable work centers and housing. Currently Walnut Creek BART Station is undergoing redevelopment, with the surrounding surface parking lots being converted into Transit-Oriented Development (TOD), with 596 multi-family housing units and 27,000 square feet of retail space [4]. A new private parking garage adjacent to the station concourse was completed in 2019, as well as a new intermodal bus facility. This intermodal facility is where all future bus service accessing the station would be routed through.

Bollinger Canyon Park-and-Ride

Bollinger Canyon Park-and-Ride (PNR) has 100 parking spaces and is located in the southwest corner of the I-680 and Bollinger Canyon Road interchange. The PNR can be accessed via off ramps from I-680 onto Bollinger Canyon Road and is just across I-680 from Bishop Ranch, a major regional employment center in San Ramon. Currently the PNR is not served directly by transit, but County Connection Route 35 circulates in the area between the San Ramon Transit Center and Bollinger Canyon Road.

[4] https://www.bart.gov/about/business/tod/upcoming

West Dublin/Pleasanton BART Station

This station has 1,190 parking spaces: a 722-space garage on the Dublin side (north) and a 468-space garage on the Pleasanton side (south). There are five bus bays on the north side and one on the south side. The station also has 40 bike lockers. The station can be accessed from the north via Golden Gate Drive and from the south via Stoneridge Mall Road. The station is served by County Connection and Wheels.

The station is in the median of I-580 and near many major employers, most notably Workday and Safeway headquarters.

Dublin/Pleasanton BART Station

This station has 2,886 parking spaces in both surface lots and garages, 68 bike lockers, 12 bus bays on the Dublin side (north), and five bus bays on the Pleasanton side (south). The station is served by County Connection, Wheels, MAX, AC Transit, Amtrak Thruway, and San Joaquin RTD; and on the weekends by Stanislaus Regional Transit. The station has a transit village next to it on the north side. The station is accessed via De Marcus Boulevard and Iron Horse Parkway on the north, and via Owens Drive on the south. The station platforms are located in the median of I-580.

Pleasanton ACE

The parking lot for Pleasanton ACE has approximately 350 spots in its lot and an adjoining Alameda County Fairground lot; ACE riders can park in both lots. The station is across Pleasanton Avenue from the Alameda County Fairgrounds. The bus curb on Pleasanton Avenue has one covered shelter; it has room for approximately three to four buses. There is plenty of space for buses to layover so drivers to take breaks. There are no bike lockers at this station, only bike racks. Pleasanton ACE is accessible via Bernal Avenue from I-680. The station is served by County Connection and Wheels. The surrounding area is low density residential and open space.

1.1.5 Previous Studies

There have been a number of transportation studies in the past six years that involved the I-680 and I-580 corridors. This section summarizes each study.

Tri-Valley Transportation Plan and Action Plan for Routes of Regional Significance, 2014, Tri-Valley Transportation Council [5]

The study recommended additional park-and-rides along I-580, County Connection service changes to reflect the increase in development in San Ramon, expanded LAVTA bus service connecting to other modes of transportation, and additional local bus service.

I-680 Transit Investment/Congestion Relief Options Study, 2015, Contra Costa Transportation Authority [6]

This study recommended that new express and local buses be implemented between Walnut Creek and Dublin, and that highway express lanes and shoulders should be used to bypass congestion. The study also looked into implementing four new park-and-rides with connecting shuttles to BART stations.

Plan Bay Area 2040, 2017, Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments [7]

Plan Bay Area is a long-range plan for the nine-county region of the Bay Area focused on transportation and land use as it relates to the economy, environment, and housing stock. It is part of a joint effort between the Metropolitan Transportation Commission and the Association of Bay Area Governments. *Plan Bay Area 2040* has identified the I-680 Express Lanes as a priority project as well as improvements to I-580 and I-80.

Tri-Valley Integrated Transit and Park-and-Ride Study, 2017, Alameda County Transportation Commission [8]

This study focused on park-and-rides in the Tri-Valley area, their relationship to transit services, and the possible improvements that could be made to the park-and-rides to improve usage and capacity. It looked into shuttles connecting to

[5] Tri-Valley Transportation Plan and Action Plan for Routes of Regional Significance
[6] I-680 Transit Investment/Congestion Relief Option Study
[7] Plan Bay Area 2040
[8] Tri-Valley Integrated Transit and Park-and-Ride Study

Dublin/Pleasanton BART and West Dublin/Pleasanton BART, expanding parking capacity at park-and-rides and BART stations, pricing strategies to manage spaces and intelligent transportation system (ITS) improvements at park-and-rides.

2018 California State Rail Plan, 2018, Caltrans [9]

This plan outlines short-term (2022), medium-term (2027), and long-term (2040) goals for the I-680 corridor and the Stockton area. This plan identified the need for an Express Bus service on the I-680 corridor and a Tri-Valley Hub. It also articulated specific service goals and improvements relating to the I-680 corridor, as noted in Chapter 4.

Valley Link Feasibility Report, 2019, Tri-Valley-San Joaquin Valley Regional Rail Authority [10]

This report was conducted to study the feasibility of implementing a new commuter rail service between the San Joaquin Valley and the Tri-Valley. The service would close a rail gap between ACE and BART. The service proposes seven stations between a future North Lathrop ACE Station and the Dublin/Pleasanton BART Station.

I-680 Corridor Transit Concept Study, 2019, Alameda County Transportation Commission

This study outlined a service concept for a potential Express Bus service on I-680 utilizing express lanes. It proposed nine stops, including Martinez Amtrak Station, Walnut Creek, San Ramon, Dublin, and the San Jose Diridon Station.

City of Pleasanton Bicycle & Pedestrian Master Plan, 2018, City of Pleasanton [11]

This plan is an update to the 2010 plan. It contains goals, policies, and recommendations for implementing a citywide bicycle and pedestrian network. Key changes to the 2010 plan include greater focus on safe routes to school and safety in general.

Passenger Rail Service Novato to Suisun City, 2019, Sonoma-Marin Area Rail Transit District [12]

Sonoma-Marin Area Rail Transit District (SMART) is considering extending rail service to Solano County along SR 37 and SR 12 through Napa to Fairfield/Suisun City. Released in May 2019, the *Passenger Rail Service Novato to Suisun City* report examines the technical feasibility of connecting passenger rail service between Solano, Marin, and Napa County, as well as documenting the physical condition of the existing rail infrastructure along the corridor.

Mobility Forward Tri-Valley Paratransit Study, 2019, LAVTA [13]

In 2019 LAVTA conducted the Mobility Forward Tri-Valley Paratransit Study to help identify near-term changes to service to improve paratransit options for people in the Tri-Valley, develop strategies that focus on responding to local needs, ensure compliance with Federal Transit Administration (FTA) requirements and requirements of the Americans with Disabilities Act (ADA) of 1990, and explore expanding service options to meet the needs of an aging population.

Other Studies

City of Dublin Bicycle and Pedestrian Master Plan, 2014, City of Dublin [14]

This plan combines an updated 2007 *Dublin Bikeways Master Plan* with the first pedestrian plan for the city of Dublin into a single document that outlines policies, network plans, projects organized by priority, and establishes best practices and design guidelines for pedestrian and bicycle facilities.

LAVTA Short Range Transit Plan FY2016-2025, 2016, LAVTA [15]

The purpose of LAVTA's Short Range Transit Plan (SRTP) is to provide an understanding of the Tri-Valley Region's existing conditions, evaluate performance, provide recommendations, and plan for operational sustainability over the timeframe covered by the plan (through FY 2025). The plan included demographic analysis, an overview of the current system and its performance, the service standards for operation, an evaluation of service using three-year retrospective metrics, an operations plan and budget, and a Capital Improvement Plan (CIP).

[9] 2018 California State Rail Plan
[10] Valley Link Feasibility Report
[11] City of Pleasanton Bicycle & Pedestrian Master Plan 2018
[12] SMART Passenger Rail Service Novato to Suisun City Report 2019
[13] Mobility Forward Tri-Valley Paratransit Study 2019
[14] City of Dublin Bicycle and Pedestrian Master Plan 2014
[15] LAVTA Short Range Transit Plan FY 2016 - 2025

County Connection Short Range Transit Plan 2016-2025, 2016, Central Contra Costa Transit Authority [16]

The SRTP outlines the existing conditions in County Connection's service area, notes the basic needs for operations, describes the level of service goals, and cites the operating and capital plans needed to address conservative ridership growth forecasts. Like the LAVTA SRTP, the plan includes a demographic analysis, an operations and planning budget, and a CIP. The plan establishes goals, objectives, and performance standards, and outlines a vision for enhanced services.

Contra Costa Transportation Authority Express Bus Study 2016 Update, 2017, CCTA [17]

The CCTA *Express Bus Study 2016 Update* builds off the original *Express Bus Study* from 2001 to account for changes in existing conditions. The study area included SR 4, I-80, I-680, and Eastern Contra Costa County (i.e. Brentwood, Antioch). The study catalogues the existing park-and-ride facilities, explores the possibility of highway ramp/in-line stops, discusses emerging trends in bus transit such as electric vehicles and real-time information, examines the travel markets in the region, and provides service recommendations and cost estimates.

I-580 Express Lanes After Study: Report to the California Legislature, 2018, Alameda CTC [18]

This report was required by Assembly Bill 2032 as a follow-up to the construction and opening of the I-580 Express Lanes in eastern Alameda County in the Dublin-Pleasanton-Livermore area in order to assess the effectiveness of the lanes. It was reported that the lanes did improve mobility and travel time reliability across all lanes within the corridor, even during a period of increasing travel demand. Specifically, daily traffic volumes have increased two to four percent per year along the corridor, but the project has reduced peak period travel times by 20 to 30 percent compared to the baseline conditions established in spring of 2015.

San Joaquin Council of Governments 2018 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), 2018, SJCOG [19]

Adopted June of 2018, the San Joaquin Council of Governments (SJCOG) 2018 RTP focuses on the intersection of environmental sustainability and transportation policy. The plan covers building of civic engagement, policies and supportive strategies, financing mechanisms and requirements, performance of policies so far, discusses the economic conditions of the region, looks into the role of technological innovations, and provides a framework for implementing the plan.

Travel Demand Analysis Memo, 2018, Capitol Corridor Joint Powers Authority

CCJPA initiated this study to determine travel demand and underserved markets along the *Capitol Corridor* route. Cell phone data was used to identify underserved markets along the route. These include commuter trips from northern San Joaquin County, the Tri-Valley area and I-680 corridor communities to the Mid-San Francisco Peninsula, and from I-680 corridor communities to Sacramento.

Alameda Countywide Transit Plan, 2018, Alameda CTC [20]

This plan's vision was developed to reflect the need to achieve financial sustainability by allocating resources strategically to enhance transit operations with the best return on investment. The seven goals of the plan are: increase travel mode share; increase effectiveness; increase cost efficiency; improve access to work, education, services, and recreation; reduce emissions; and achieve state of good repair. The plan recommends identifying transit corridors that have the potential to capture large transit ridership.

Livermore Bicycle, Pedestrian, & Trails Active Transportation Plan, 2018, City of Livermore [21]

This plan replaces the city of Livermore's 2001 Bikeways and Trails Master Plan, putting greater emphasis on pedestrian access and usage. The plan implements the city's Complete Street Policies outlined in the Livermore General Plan as well as provides guidance for the City's Climate Action Plan.

Ongoing Transit Programs and Projects

Go Tri-Valley

Go Tri-Valley is a partnership between LAVTA and ridesharing companies Uber and Lyft whereby LAVTA will pay as much as 50 percent of the fare (up to $5) per ride if a patron's trip begins and ends within Dublin, Livermore, and Pleasanton. The West Dublin/Pleasanton BART, Dublin/Pleasanton BART Station, as well as the Pleasanton ACE Station, Livermore ACE

[16] County Connection Short Range Transit Plan 2016 - 2025
[17] CCCTA Express Bus Study 2016 Update
[18] I-580 Express Lanes After Study
[19] SJCOG 2018 RTP
[20] Alameda Countywide Transit Plan 2018
[21] Bicycle, Pedestrian, & Trails Active Transportation Plan 2018

Station, and Vasco Road ACE Station are within the service area. The program was started in 2017 in Dublin only as GoDublin and was expanded to LAVTA's entire service area in May 2020.

LAVTA Shared Autonomous Vehicles Demonstration Project

In partnership with Transdev and EasyMile (a self-driving shuttle company), LAVTA has been testing the usage of shared autonomous vehicles (SAVs) on public roads in Dublin. In summer of 2018 Assembly Bill 1444 allowed LAVTA to proceed with this testing and partnership. The goal of the program is to provide first/last mile connections with BART stations in the Tri-Valley area.

A similar program was created in Bishop Ranch with County Connection and EasyMile under Assembly Bill 1592. The County Connection program focuses on shuttling employees around Bishop Ranch.

RTD Van Go!

RTD Van Go! is an on-demand rideshare service provided in vehicles that are safe and accessible. Customers may book a trip up to two days in advance using the Van Go! App and ride anywhere in San Joaquin County. There is a $4.00 one-way base fare per passenger for the first five miles and $0.50 per mile after the fifth mile. This service operates seven days a week including holidays from 8:00 AM to 5:00 PM.

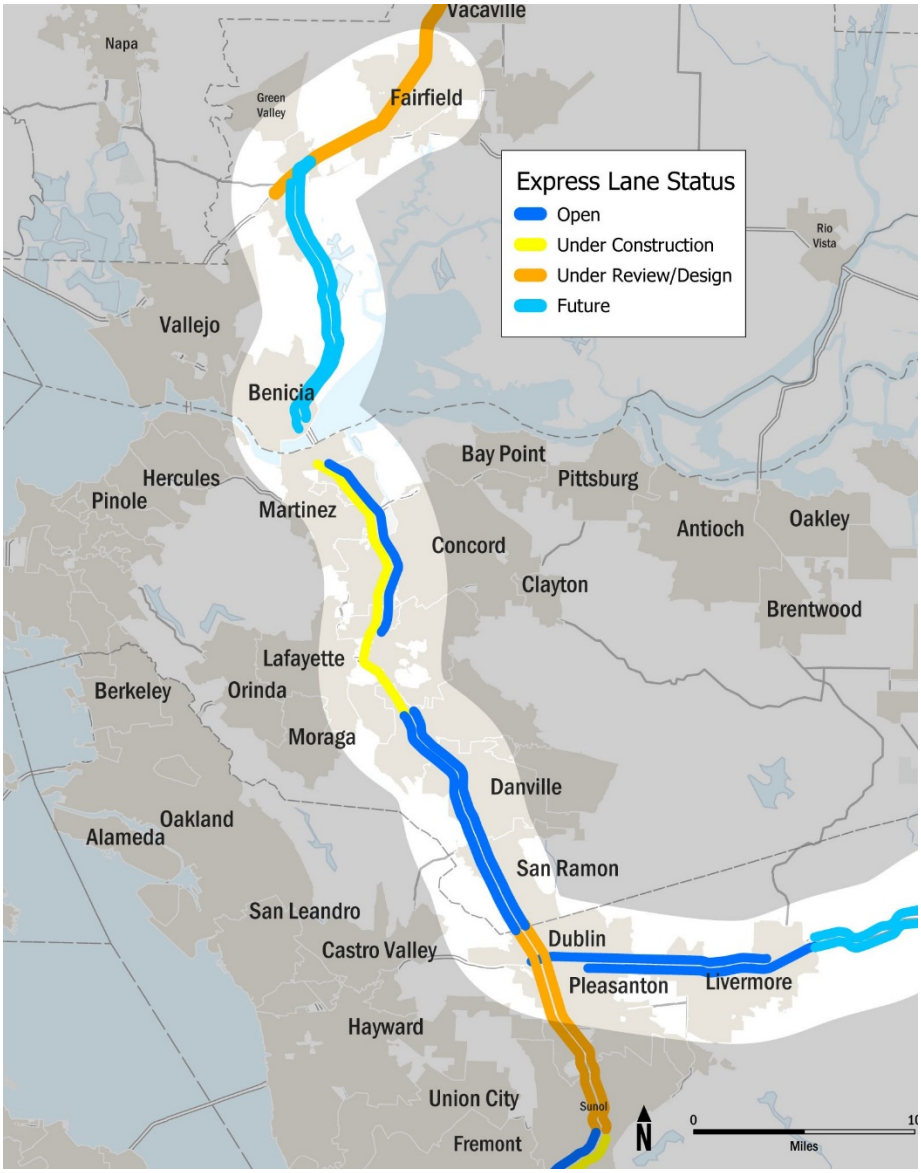
Chapter 2 - Future Conditions

This section looks at the future express lanes network in the I-680 and I-580 corridors, travel markets identified in the 2018 *California State Rail Plan*, and future jobs and population growth trends.

2.1 Express Lanes Network

The corridor currently has express lanes along I-680 between Dublin and Walnut Creek, and on I-580 between Dublin/Pleasanton and the Altamont Pass. The region has extensive plans for an expanded network of express lanes, seen in greater detail in **Figure 10**. The regional express lane network within the study area would consist of continuous express lanes along all of I-80, I-680, and I-580.

Figure 10. Bay Area Express Lanes Network

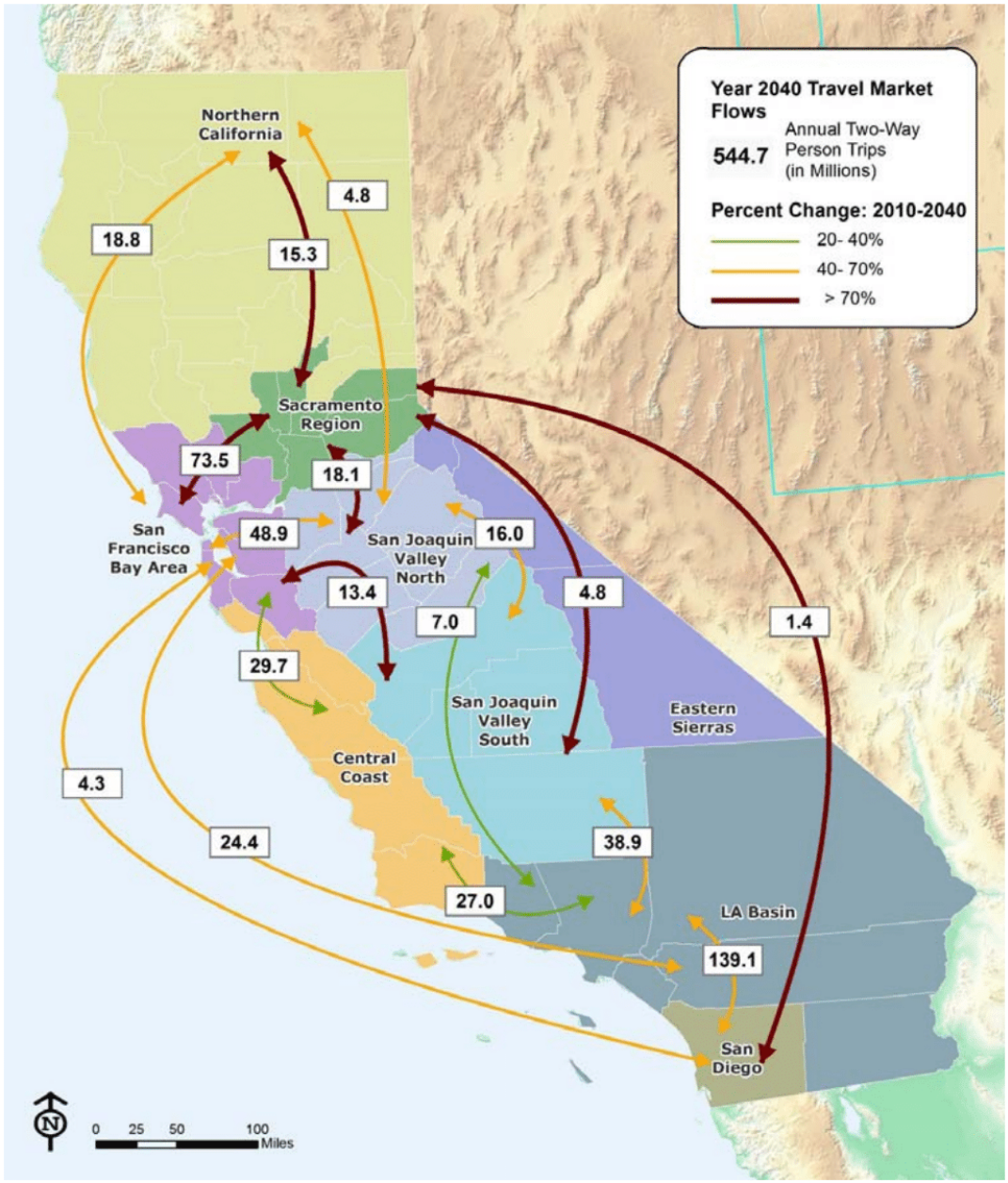


Source: AECOM, Caltrans, MTC

2.2 2018 *California State Rail Plan* Travel Market Analysis

According to the 2018 *California State Rail Plan* (CSRP), the corridors between Sacramento and the San Francisco Bay Area and between the Bay Area and the Northern San Joaquin Valley were the second and third largest interregional travel markets, with 42.3 million and 31.2 million annual trips, respectively, in 2010. By 2040, the number of interregional trips is projected to grow to 73.5 million annual trips for Sacramento to/from San Francisco Bay Area and 48.9 million annual trips for San Francisco Bay Area to/from the northern San Joaquin Valley [22]. The study area encompasses portions of both of these corridors. **Figure 11** shows all projected 2040 travel market flows statewide.

Figure 11. 2018 CSRP 2040 Travel Market Flows



Source: 2018 California State Rail Plan

[22] 2018 California State Rail Plan

2.3 Jobs and Population Forecasts

As part of Plan Bay Area 2040, ABAG in conjunction with MTC have created forecasts for population, households, and employment for the nine county Bay Area [23]. Below is data presented from Plan Bay Area 2040 showing projections for major cities along the study corridor in Contra Costa (**Table 3**), Alameda (**Table 4**), Solano (**Table 5**), and San Joaquin (**Table 6**) counties. Green represents the highest increase while yellow represents the lowest increase.

The cities projected to experience the greatest job growth are Concord, Stockton, San Ramon, Dublin, Pleasanton, Fairfield, and Stockton. The cities projected to have higher grow in population are Concord, Dublin, Livermore, Fairfield, and Stockton.

As seen previously in Table 2Table 2. Historical Job and Population Growth 2007 to 2017 San Ramon saw the most growth over the past decade in Contra Costa County in terms of both jobs and population. However, according to the ABAG forecast results in Table 3, Concord is projected to see the greatest growth in the coming decades.

Table 3. Contra Costa County Jobs and Population Forecast

Contra Costa County						
City	Jobs			Population		
	2020	2040	Increase	2020	2040	Increase
Concord	64,550	95,455	30,905	134,605	185,850	51,245
Martinez	24,845	26,085	1,240	36,660	40,035	3,375
Pleasant Hill	19,180	19,800	620	33,590	35,925	2,335
San Ramon	53,850	71,775	17,925	76,485	84,165	7,680
Danville	13,065	13,120	55	44,625	47,350	2,725
Walnut Creek	57,520	58,090	570	69,010	81,265	12,255
Total			51,260			76,890

Source: ABAG, MTC

Pleasanton's population growth is projected to slow, while Livermore's population growth is expected to increase. Dublin is projected to continue to add both jobs and population rapidly.

Table 4. Alameda County Jobs and Population Forecast

Alameda County						
City	Jobs			Population		
	2020	2040	Increase	2020	2040	Increase
Dublin	21,330	31,115	9,785	51,070	83,595	32,525
Livermore	43,025	45,870	2,845	84,935	113,730	28,795
Pleasanton	65,185	75,440	10,255	75,030	87,875	12,845
Total			22,885			74,165

Source: ABAG, MTC

Past jobs and population growth trends in Solano County can be expected to continue into the future, with Fairfield leading the way in growth in both categories.

Table 5. Solano County Jobs and Population Forecast

Solano County						
City	Jobs			Population		
	2020	2040	Increase	2020	2040	Increase
Benicia	14,550	17,080	2,530	27,570	30,735	3,165
Fairfield	43,660	50,035	6,375	106,815	126,900	20,085
Suisun City	2,595	2,860	265	28,130	31,670	3,540
Total			9,170			26,790

Source: ABAG, MTC

[23] Projections 2040 by Jurisdiction - Plan Bay Area 2040

The population increases in San Joaquin County surpass the population growth of any other region in the study area. While job growth in Stockton has been slower in the past, growth is projected to pick up significantly over the coming decades.

Table 6. San Joaquin County Jobs and Population Forecast

San Joaquin County						
	Jobs			Population		
City	2020	2040	Increase	2020	2040	Increase
Stockton	121,350	151,979	30,629	329,729	432,627	102,898
Tracy	24,651	29,616	4,965	95,040	127,933	32,893
Manteca	17,592	22,146	4,554	77,018	103,958	26,940
Total			40,148			162,731

Source: San Joaquin Council of Governments (SJCOG), Eberhardt School of Business UOP

Chapter 3 - I-680 Corridor Transit Service and Facility Needs

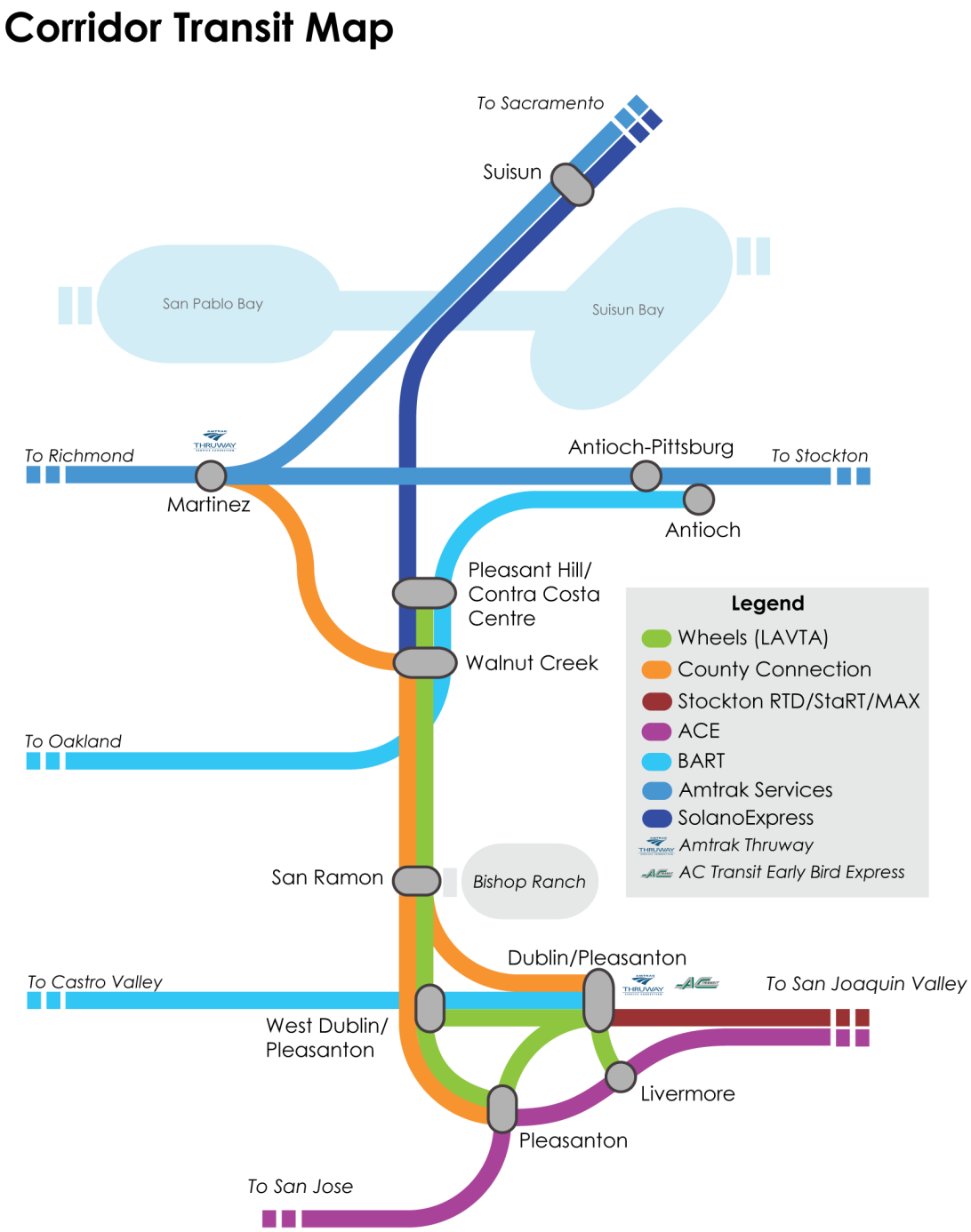
An I-680 Express Bus service and a Tri-Valley Hub are solutions to a very specific problem identified in the 2018 *California State Rail Plan*. That is, the corridor and the Tri-Valley in particular are not well connected to the state rail system. The Express Bus corridor service and the Tri-Valley hub would remedy that deficiency.

As noted previously, existing transit services in the I-680 corridor include two east-west BART lines and local transit, along with employer shuttles. Rail services, including Amtrak long-distance services, the *Capitol Corridor*, the *San Joaquins*, and ACE commuter rail touch the corridor on the north and south. But options linking major corridor communities with these rail services are few. These are:

- Fairfield and Suisun Transit's Blue Line (operated with SolTrans as part of the SolanoExpress) linking Sacramento Valley Station with the Pleasant Hill/Contra Costa Centre BART Station. In the near future this route will terminate at Walnut Creek BART instead of Pleasant Hill/Contra Costa Centre BART.
- County Connection Route 98X linking the Martinez Amtrak station with the Walnut Creek BART Station. County Connection 92X connects Pleasanton ACE and Walnut Creek, and 97X connects San Ramon Transit Center with Dublin/Pleasanton BART.
- Wheels Routes 53 and 54 linking the Pleasanton ACE Station with West Dublin/Pleasanton BART and Dublin/Pleasanton BART.
- *Capitol Corridor* trains stopping at Martinez and Suisun. The *San Joaquins* stops at Martinez.
- Wheels 70X connects Pleasant Hill/Contra Costa Centre BART, Walnut Creek BART, and Dublin/Pleasanton BART.
- BART's Yellow Line linking Walnut Creek, Pleasant Hill, Concord, and North Concord.

These services are graphically represented in **Figure 12**.

Figure 12. Transit Operators and Corridor Connections



While patrons can theoretically make connections between all services shown above, there are no one-seat rides offered between the Tri-Valley and either Martinez and Suisun Amtrak stations for furtherance to Sacramento and Stockton; or between northern Contra Costa communities of Walnut Creek, Pleasant Hill, and Concord and the Pleasanton ACE Station for furtherance to Silicon Valley work centers.

An I-680 Express Bus service, running between Suisun in the north and the Tri-Valley in the south, would fill the gap. Southern termini could include the BART West Dublin/Pleasanton and Dublin/Pleasanton stations, and could extend to the Pleasanton ACE Station during the morning and evening commute periods, just as Wheel buses and County Connection buses do today. Alternatively, Express Buses could continue south on I-680 to San Jose. Such an option has been recently explored by Alameda County Transportation Commission. Corridor Express Buses would make use of I-680 corridor express lanes to maintain higher speeds in the peak direction during peak commute periods.

Dublin/Pleasanton BART would provide connections to the existing RTD Route 150, as well as multiple Wheels and County Connection routes, and thus could serve as the Tri-Valley Hub called for in the *California State Rail Plan*. In the future, Valley Link, a new regional rail service planned between North Lathrop and Dublin/Pleasanton BART, will provide a transit option for commuters from northern San Joaquin County communities of Tracy, Manteca, Lathrop, and Stockton, as well as from Livermore, to access the BART system.

For commuters from northern San Joaquin County communities and from the Tri-Valley heading for Silicon Valley work centers, ACE will continue to provide a public transportation option. According to its Altamont Corridor Vision [24], ACE is looking one day to run 10 weekday round trips between Stockton and San Jose, versus the carrier's current four round trips. ACE riders will still be able to access the BART system via Wheels and County Connection routes operating to and from the Pleasanton ACE Station. While most ACE riders will likely make transfers to private shuttles at Great America in Santa Clara, ACE one day may have a connection to the proposed Dumbarton Rail Corridor service at Fremont/Centerville for furtherance to Mid-Peninsula work centers.

3.1 Sketch Level Facilities Needs

This section discusses candidate facilities for a Tri-Valley Hub. It also notes needs of facilities that could serves termini and intermediate stops for a I-680 corridor Express Bus service.

3.1.1 Tri-Valley Hub and Potential Locations

An important component of the vision for an integrated statewide rail network in the 2018 *California State Rail Plan* is the establishment of hub stations. These hub stations are envisioned to co-locate rail, transit, bicycle, and pedestrian facilities to connect people to the rail network through coordinated schedules and infrastructure, and more effectively expand the coverage of the statewide rail system by connecting regional corridors to each other. The rail plan identifies numerous hub stations as centrally located rail stations to which local and regional transit systems also provide timed connections, establishing transfer points for riders to continue their journeys.

The rail plan also identifies a need for a Tri-Valley Hub that will serve as a central location for the following connections:

- Rail connection to the future East Bay Hub near Newark, Hayward, or Fremont;
- Rail connection to the future Stockton Area Hub; and,
- Integrated bus transit to the future Solano County Hub.

The exact locations of the East Bay Hub, Stockton Area Hub, and Solano County Hub have not been finalized. The rail plan states that the East Bay Hub should provide connections to north-south service between Oakland and San Jose, east-west service between the Stockton area and San Jose, and the future Dumbarton Bay crossing. Multiple options exist and are currently being studied by Alameda County for the East Bay Hub, including the Union City BART Station, the Fremont/Centerville *Capitol Corridor*/ACE Station, and potential stations near Shinn and at the intersection of the Dumbarton Bridge and the Coast Line rail corridors, among others. For the purposes of this study, it is assumed that the East Bay Hub will provide connectivity to both ACE, *Capitol Corridor*, Dumbarton, and BART services to meet the goals established by the 2018 *California State Rail Plan*.

For the purposes of this study, it is assumed that the Stockton Area Hub will provide connectivity to both ACE and future Valley Link service, i.e. the extensions of ACE to Sacramento and Merced and expanded *San Joaquins* service. The Solano County Hub is assumed to be at the Suisun-Fairfield Amtrak Station, based on its future potential to connect directly to SMART service and existing Amtrak *Capitol Corridor* service.

[24] https://acerail.com/altamont-corridor-vision/

Based on the connection criteria enumerated by the rail plan for the Tri-Valley Hub and the considerations for the East Bay, Stockton Area, and Solano County Hubs discussed above, three potential Tri-Valley Hub locations are identified below.

Dublin/Pleasanton BART Station

The Dublin/Pleasanton BART Station is located within the median of I-580, approximately one mile east of the I-580/I-680 interchange. This station is suited as a potential Tri-Valley Hub due to its proximity to I-680 to provide connections north to the Solano County Hub, as well as its planned rail connection to the Stockton Area Hub through Valley Link service. The Dublin/Pleasanton BART Station will serve as the western terminus for Valley Link service and will facilitate direct transfers between BART and Valley Link service. Phase 1 of Valley Link will provide service eastward to the San Joaquin Valley with stops in Livermore, Tracy, Lathrop, and Phase 2 of the Valley Link project will provide service to Stockton.

In addition to providing a direct rail connection throughout the San Francisco Bay Area via the BART system and the San Joaquin Valley via planned future Valley Link service, the Dublin/Pleasanton BART Station also serves as a major hub for local bus routes. This station is a central hub for seven different bus operators, including multiple Wheels and County Connection (each of which has multiple routes), as well as longer distance commuter buses from Stanislaus and San Joaquin counties.

Based on its existing rail and bus transit connectivity, the Dublin/Pleasanton BART Station would be a logical candidate for the Tri-Valley Hub, assuming that the planned Valley Link service connecting the Dublin/Pleasanton BART Station to the San Joaquin Valley is developed and operational within the timeframes established by the 2018 *California State Rail Plan*. Valley Link would ultimately provide a connection to a Stockton Area Hub. The site would not provide a connection to the East Bay Hub in the Newark/Fremont area, except via a BART transfer at the Bayfair BART Station in San Leandro.

West Dublin/Pleasanton BART Station

The West Dublin/Pleasanton BART Station is located within the median of I-580, approximately one-quarter mile west of the I-580/I-680 interchange. This station is suited as a potential Tri-Valley Hub due to its proximity to I-680, which provides an easy connection to the Solano County Hub via I-680, and the direct connection it provides to the San Francisco Bay Area via the BART system. This station is also served by three Wheels local bus routes. Because it is a BART station and has local transit connections, West Dublin/Pleasanton BART is a viable candidate for a Tri-Valley Hub. However, connectivity to an East Bay Hub is the same as for Dublin/Pleasanton BART. Connectivity to the Stockton Area Hub would require a trip on BART to the Dublin/Pleasanton Station and a transfer to the future Valley Link rail service or even the RTD Route 150 service; or alternatively a trip via Wheels to the Pleasanton ACE Station and a transfer to ACE service.

Pleasanton ACE Station

The Pleasanton ACE Station is located within the city of Pleasanton in the northwest corner of Bernal Avenue and Pleasanton Avenue, approximately three miles south of the I-580/I-680 interchange and one mile east of I-680. This station is suited as a potential Tri-Valley Hub due to its direct rail connections to Stockton and to the South Bay Area via ACE service. This station is also served by two Wheels routes and one County Connection route.

Although the station could provide access to an East Bay Hub and a Stockton Area Hub via ACE service, the station is four miles apart from BART and therefore will not be able to provide the same network connectivity to the rest of the San Francisco Bay Area via the BART system when compared to the West Dublin/Pleasanton BART and the Dublin/Pleasanton BART. In addition, while ACE expects in the long term to significantly ramp up service, its level of service will not be as frequent as BART's.

Having considered the above, this analysis has developed a high-level service concept for the I-680 Express Bus service assuming Dublin/Pleasanton BART and the West Dublin/Pleasanton BART as the more viable candidates for the Tri-Valley Hub. Also, the concept includes a service extension to the ACE Pleasanton Station to connect with ACE trains.

3.1.2 I-680 Express Bus Stops Facilities Needs

At a minimum, a new I-680 Express Bus service would require facilities in the form of a bus bay or curbside bus space at each of the proposed stops to drop off and pick up riders for an average of 60 seconds at each stop. In addition, at each of the proposed terminus stops, a location for the bus to have a short layover so the driver can take a break before continuing the journey back along the route. In addition to stop and layover space, additional parking access and bike access for potential riders are desirable.

This section provides a high-level overview of the capacity for the proposed bus service to include a stop at Suisun-Fairfield Amtrak Station, Martinez Amtrak Station, Pleasant Hill/Contra Costa Centre BART Station, Walnut Creek BART Station, Bollinger Canyon Park-and Ride, Dublin/Pleasanton BART Station, West Dublin/Pleasanton BART Station, and the Pleasanton ACE Station using existing bus bay and curbside bus space infrastructure. It also includes an overview of the existing parking availability, highway access and bike access to each station. **Appendix C** includes aerial graphics that supplement the narrative that follows. The graphics depict the existing bus stop access, car parking, bike parking, and bike and pedestrian access as applicable for each stop.

Suisun-Fairfield Amtrak Station

The bus island adjacent to the Suisun-Fairfield Station ticket office and platform is approximately 200 feet long and contains two passenger shelters and sufficient space for four buses along the south side of the island.

There are five bus transit services that currently use these spaces, four of which are all-day or peak period hourly services, and one of which arrives every 20 minutes during peak periods. Based on the relatively low frequency of bus service at this station, the comparable numbers of available bus spaces to bus services stopping at this station, and preliminary discussions with CCJPA staff, it is reasonable to assume that there is capacity for additional bus service to this station. Coordination of bus space would need to occur with Solano Transportation Authority, FAST, VINE, Delta Breeze, and Amtrak Thruway bus service to ensure space can be shared without degrading the service of existing bus routes, and to time arrivals to accommodate all bus service at the Suisun-Fairfield Station.

As the proposed northern terminus of the I-680 Express Bus service, the Suisun Amtrak Station would also need to provide a location for a 15-minute layover. Although capacity appears to exist for additional bus services to stop at the station, there is no capacity for layover at the existing bus stop area adjacent to the station. An alternative location for I-680 Express Buses to layover could be the park-and-ride lot east across Main Street, pending coordination with the city of Suisun City.

The park-and-ride lot for the Suisun-Fairfield Amtrak station contains approximately 250 parking spaces and has capacity to support additional parking demand. For additional parking, undeveloped land to the east of the station has been earmarked for additional parking by CCJPA. If developed, this additional parking could also be used by I-680 Express Bus riders pending coordination with CCJPA.

This station is located immediately off Highway 12 via the Main Street exit. Buses would access the station by exiting Highway 12 onto Lotz Way and exit the station on Main Street towards Highway 12. The station also currently offers five bike rack spaces and four bike lockers. The Central County Bikeway provides dedicated bike and pedestrian access to the station from the north, and a dedicated pedestrian path also provides pedestrian access to the station from north of SR 12 parallel to Union Avenue. Additional bike parking and storage would complement the proposed I-680 Express Bus service at this station.

Martinez Amtrak Station

Curbside space for seven buses and four passenger shelters are located along the perimeter of the parking lot at the Martinez Amtrak Station. There are currently nine bus routes that serve the Martinez Amtrak Station, five of which provide a minimum of hourly service, and four of which provide a maximum of half hourly service during the peak period. The relatively low frequency of bus service at this station, comparable numbers of available bus spaces to bus services stopping at this station, and preliminary discussions with CCJPA staff indicate that there is capacity for additional bus service pending coordination with the city of Martinez and transit operators currently serving the station, including the operators of Tri-Delta Transit, County Connection, and WestCAT bus services.

The park-and-ride lot for the Martinez Amtrak Station contains approximately 130 parking spaces, and an overflow parking lot with approximately 175 spaces is located north of the station accessed via Ferry Street and a pedestrian bridge from the station. These lots currently have capacity to support some additional parking demand generated by an I-680 Express Bus.

The Martinez Station is not directly accessible from I-680; the station is located approximately one mile west of I-680 via Marina Vista Avenue. Buses would access the station from I-680 via Marina Vista Avenue and return to the freeway via Escobar Street. The station includes seven bike rack spaces and eight bike lockers.

Pleasant Hill/Contra Costa Centre BART Station

There are 10 bus spaces at Pleasant Hill/Contra Costa Centre BART adjacent to the station on the southeast side on Coggins Drive. Given the current bus routes serving the station and their schedules there appears to be sufficient capacity for

this potential service to stop at this station. A notable interregional service that stops here is the SolanoExpress Blue Line, which forms its southern terminus at Pleasant Hill/Contra Costa Centre BART and continues north to Suisun City and Sacramento. Two private employer shuttles utilize the station as well, making as many as five stops per day.

Pleasant Hill/Contra Costa Centre BART Station has a seven-story BART-operated garage to the north with a capacity of 2,937 parking spaces. While at most BART garages these spaces would only be available to BART patrons, the garage at Pleasant Hill/Contra Costa Centre BART Station allows non-BART riders to use the parking garage for other transit services as part of a Caltrans funding arrangement. Pay stations for garage use are outside the BART fare gates for this purpose. There is a private overflow lot operated by Impark across the street from the station to the north, as well as a private parking garage just off of Oak Road to the west.

The station offers 88 secure bike lockers to patrons, as well as a BART Bike Station which provides indoor bike storage as well as basic tools for performing repairs. The station is to the west of the Iron Horse Regional Trail, which provides excellent bike access to the station.

This station is proximal to I-680 with buses able to exit the highway and access the station via Treat Boulevard. Buses would circulate through the bus area from Treat Boulevard onto Oak Road and then Coggins Drive. Buses would exit the station area via Jones Road and return to Treat Boulevard and proceed to I-680.

Walnut Creek BART Station

There are 13 bus bays located between the South Garage and the North Garage. Based on a preliminary analysis of the bus routes currently serving the Walnut Creek BART Station, there is potential capacity for one additional bus service that is hourly in the near-term and half-hourly in the long-term at the existing bus spaces, if the sharing of curb space and timing of arrivals is coordinated with the other bus services currently serving this station. The new bus bays are part of the new Walnut Creek BART Transit Center, which is itself part of the ongoing TOD redevelopment of the station area. The surrounding development will have no circulation impact to the bus bays, but it will introduce housing, retail, and office space into the immediate vicinity of the station concourse and new transit center. This new dense development has the potential to increase Express Bus service demand and ridership without requiring additional parking spaces for patrons, as all new development is within walking distance to the route stop.

Potential capacity to share bus space could occur if Express Bus service implementation is coordinated with County Connection Route 1 service, County Connection Route 601 service, SolanoExpress Yellow Line service, and Wheels Route 70X service. Route 1 has a dedicated curb space for its northbound stop between the Rossmoor and Shadelands areas of Walnut Creek. Since Walnut Creek BART Station is not a terminus for Route 1 service, it can be assumed that northbound Route 1 buses stop at this dedicated curb space for an average of 60 seconds to drop off and pick up riders. Because the Walnut Creek BART Station is also not a terminus for the proposed I-680 Express Bus service, a 60-second northbound stop and a 60-second southbound stop would be required at this station. Therefore, it is reasonable to assume that there is potential capacity for the I-680 Express Bus service northbound or southbound stop to share curb space with the dedicated Route 1 northbound curb space, pending coordination with County Connection.

Additionally, the Solano Express Yellow Line service provides all-day half-hourly service between Vallejo and Walnut Creek, with four-minute layovers at the Walnut Creek BART Station. As a result, the dedicated Yellow Line curbside space at Walnut Creek BART Station is generally vacant for approximately a minimum of 26 minutes at a time, and therefore could also potentially share curb space with an I-680 Express Bus service northbound or southbound stop, pending coordination with Solano Transportation Authority.

Finally, the Wheels 70X bus service also has dedicated curb space at the Walnut Creek BART Station, and it provides half-hourly loop service during the peak periods between the Dublin/Pleasanton, Walnut Creek, and Pleasant Hill/Contra Costa Centre BART Stations. Because Route 70X buses do not layover at the Walnut Creek BART Station, there could be potential to share curb space with an I-680 Express Bus service at this location as well, pending coordination with LAVTA.

Two parking garages, the North Garage and South Garage, contain approximately 2,100 parking spaces at the Walnut Creek BART Station. However, all parking in these structures are dedicated for BART patrons only and would not be able to accommodate riders of an I-680 Express Bus service. Two privately operated garages open to all are located to the east and the north of the station. Additional parking would likely need to be identified to accommodate additional parking demand at this station.

This station is directly accessible from I-680, located immediately off the Ygnacio Valley Road exit. Buses would access the station from southbound I-680 via the Main Street exit, turning right onto Ygnacio Valley Road and right again onto BART Way; and from northbound I-680 via the Ygnacio Valley Road exit. Buses would return to I-680 and continue south by taking North California Boulevard south to Ygnacio Valley Road; and continue north by following North California Boulevard to the Lawrence Way on-ramp. The station includes bike rack space and 72 bike lockers.

Bollinger Canyon Park-and-Ride

This park-and-ride lot is the only potential Express Bus stop that does not serve transit today. The lot would provide access to the nearby Bishop Ranch office park. It has 100 parking spaces. The PNR is adjacent to I-680 and can be accessed via the Bollinger Canyon Road freeway exits southbound and northbound. Lacking any sort of shuttle service between the PNR and nearby Bishop Ranch, Express Bus riders would have to walk to and from the office park located about one half-mile to the east and across I-680. Room exists for bus pads for boarding and alighting riders.

West Dublin/Pleasanton BART Station

There are five bus spaces located north of the station, adjacent to and south of the North BART Garage on Golden Gate Drive. One bus space is located south of the station on Stoneridge Mall Road, adjacent and south of the Workday headquarters. Three Wheels bus routes currently stop at this station. The higher number of available spaces than bus services as well as preliminary discussions with LAVTA staff indicate that there is capacity for additional bus stops and 15-minute layovers at the West Dublin/Pleasanton BART Station.

Two parking garages, the North Garage and South Garage, contain approximately 1,000 parking spaces at the West Dublin/Pleasanton BART Station. However, all parking in these structures are dedicated for BART patrons only and would not be able to accommodate riders of an I-680 Express Bus service. A parking solution would need to be found.

This station is directly accessible from I-680 from the Stoneridge Drive exit. The station includes bike rack space and 40 bike lockers.

Dublin/Pleasanton BART Station

There are five bus bays located south of I-580 on the Pleasanton side of the station where the Iron Horse Trail exits from under I-580, and 10 bus bays located north of I-580 between Iron Horse Trail and DeMarcus Boulevard. Nineteen bus services from County Connection, Wheels, AC Transit, Stanislaus Regional Transit (StaRT), Modesto Area Express (MAX), Amtrak Thruway, and San Joaquin RTD currently stop at the Dublin/Pleasanton BART Station. Based on discussions with LAVTA staff, the 10 bus bays north of I-580 do not currently have capacity for additional buses. However, the five bus bays south of I-580 have capacity for an I-680 Express Bus service to stop and layover in place for 15 minutes.

The Dublin Garage and lot (north) and the Pleasanton lot (south) contain approximately 2,900 parking spaces at the Dublin/Pleasanton BART Station; however, all parking in these structures are for BART riders only. In April 2018, LAVTA also received a Transit and Intercity Rail Capital Programs (TIRCP) grant to build a new parking garage that will provide over 500 new parking spaces serving this station. This parking garage could serve non-BART riders utilizing the I-680 Express Bus service.

This station is directly accessible from I-580 off the Hacienda Drive exit. Buses would access the station by taking Hopyard Road to Owens Drive for all directions of travel. The station includes bike rack space and 68 bike lockers. The Iron Horse Trail provides dedicated bike and pedestrian access to the station from the north and south.

Pleasanton ACE Station

There is room for three buses in the bus turnout located on Pleasanton Avenue. One County Connection bus route and two Wheels bus routes stop at this station. Accordingly, there is capacity for additional bus service and a 15-minute layover at the station.

The ACE parking lot and the Alameda County Fairgrounds lot which ACE riders use together contain approximately 350 spaces. These spaces do not fill up on an average weekday and could provide some capacity to accommodate I-680 Express Bus riders.

This station is not accessible directly from the highway; the station is located approximately one mile east of I-680 via Bernal Avenue and Pleasanton Avenue. Buses would access the station from I-680 by exiting and continuing east on Bernal Avenue and turning left onto Pleasanton Avenue; buses would return to I-680 using the same route. The station includes bike racks.

Chapter 4 - Feasibility Analysis

4.1 Goals from the 2018 *California State Rail Plan*

The 2018 *California State Rail Plan* outlines specific goals and improvements pertaining to an I-680 corridor Express Bus service, more ACE service, a Tri-Valley Hub, and a Solano County Hub (a future connection for SMART and Napa County transit service). The rail plan identified the goals for three distinct time horizons: 2022, 2027, and 2040. These goals and their respective time horizons are as follows:

4.1.1 2022 Service Goals and Improvements

- Expanded capacity on peak service between the Stockton area and San Jose through the Altamont corridor with timed connections in the East Bay.
- Initial Integrated Express Bus services in the I-680 corridor, using freeway managed lanes to better connect the San Ramon Valley to Sacramento and the Bay Area.

4.1.2 2027 Service Goals and Improvements

- Integrated Express Bus services connecting SMART services to North Coast communities, to Richmond, to regional and HSR services in San Francisco, and to the statewide rail network at Suisun-Fairfield.
- Integrated Express Bus services connecting Napa County and Suisun-Fairfield.
- Half-hourly peak and hourly off-peak intercity service from Oakland to Sacramento (with the potential for some trips to be served by Integrated Express bus in low-congestion periods, should sufficient railroad capacity not be available).
- Up to half-hourly peak service in the Altamont corridor connecting San Jose and the Stockton Area, with timed connections in the Tri-Valley and East Bay to integrated transit and Express Bus services.
- Stockton-Richmond/Martinez bi-hourly regional service for connections to statewide rail network.
- Establishment of a Tri-Valley Hub to connect BART, Altamont corridor services, and Integrated Express Bus service to Solano County on the I-680 corridor.
- Assist communities throughout the East Bay, South Bay, Peninsula, and Tri-Valley in better connecting transit systems to rail and enhancing station area functions.

4.1.3 2040 Service Goals and Improvements

- Half-hourly electrified intercity service between Sacramento and San Francisco through an Oakland Hub (and continuing to San Jose).
- Half-hourly electrified regional service between a Solano County Hub and San Francisco via a Richmond and Oakland Hub.
- Half-hourly electrified local service between a Solano County Hub and an East Bay Hub through Richmond and Oakland on a dedicated electrified passenger line south of Oakland.
- Hourly service connecting the Stockton Area Hub and Martinez/Richmond.
- Hourly service between a Solano County Hub and Novato, providing timed connections to service between Cloverdale and Larkspur, or through service to Marin or Sonoma counties. Hourly service between Napa and the Solano County Hub, providing connection between Napa County and the state rail network.
- Hourly service between Richmond/Martinez and Stockton, based on transfer location recommended in a Northern Bay Area study.
- Half-hourly regional electric services between a Solano County Hub and an East Bay Hub through Oakland, with half-hourly connectivity or through service to San Jose.

- Half-hourly peak and hourly off-peak service, seven days per week, between the Stockton area and San Jose through a Tri-Valley Hub and an East Bay Hub.
- Hourly service between a Solano County Hub and Novato, providing timed connections to service between Cloverdale and Larkspur, or through service to Marin or Sonoma counties.
- Hourly service between Napa and the Solano County Hub, providing connection between Napa County and the state rail network.

4.1.4 Implications for a I-680 Corridor Express Bus Service and a Tri-Valley Hub

The aforementioned goals point to the initiation of a I-680 corridor Express Bus service by 2022. The termini of such a service are not specified. However, it can be inferred that the northern terminus would be the Solano County Hub, most likely the Suisun Amtrak Station. The southern terminus would be a Tri-Valley Hub in the San Ramon Valley. While there are three candidates for a Tri-Valley Hub, only two offer BART connections along with multiple local transit connections.

By 2027, *Capitol Corridor* service will be half-hourly during the peak and hourly during the off-peak. Furthermore, *San Joaquins* service through Martinez will become bi-hourly. ACE peak service will become half-hourly. Also, integrated bus services will link SMART and Napa County with the *Capitol Corridor* at the Solano County Hub in Suisun.

Finally, by 2040, an electrified *Capitol Corridor* service will be operating with half-hourly frequencies throughout the day, along with regional and local services with the same frequencies. *San Joaquins* service through Martinez will be hourly. ACE will have half-hourly peak and hourly off-peak frequencies. Also, SMART will operate hourly service between Marin, Sonoma, and Napa counties and a Solano County Hub in Suisun.

Accordingly, a service concept for an I-680 corridor Express Bus service and a Tri-Valley Hub could include the following elements at a minimum:

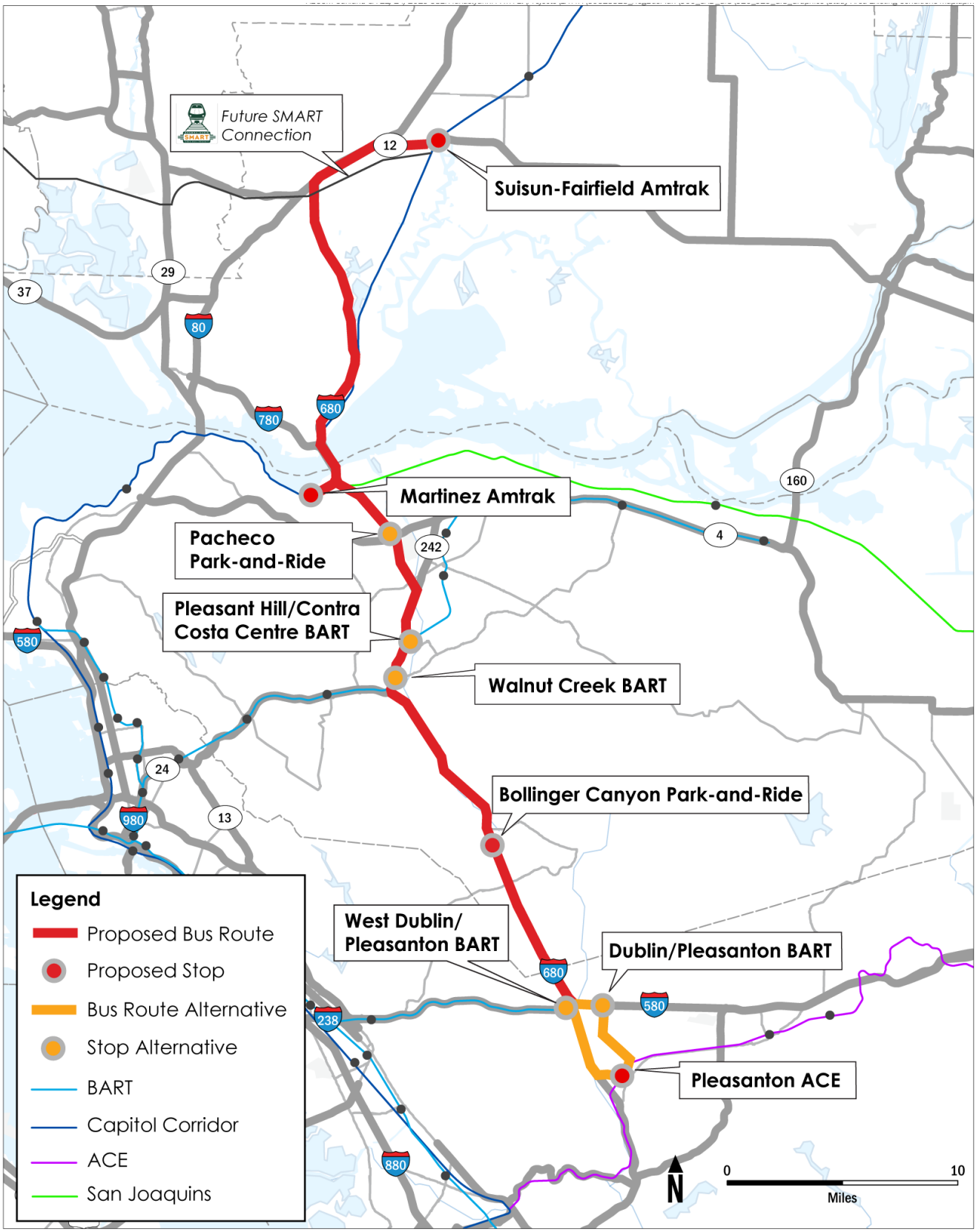
- Hourly corridor Express Bus service in the near-term (circa 2022). Stops could include:
  - Suisun Amtrak Station (connection to the *Capitol Corridor*);
  - Martinez Amtrak Station (connection to the *Capitol Corridor*, the *San Joaquins*, Amtrak long-distance services, and Thruway bus service);
  - Either Pleasant Hill/Contra Costa Centre BART Station or Walnut Creek BART Station;
  - Bollinger Canyon Park-and-Ride, connection to Bishop Ranch.
  - Either West Dublin/Pleasanton BART or Dublin/Pleasanton BART; and,
  - Pleasanton ACE Station during the peak commute periods.
- Half-hourly peak and hourly off-peak corridor Express Bus service in the mid-term (circa 2027).
- Half-hourly service throughout the day in the long term (circa 2040) between the Solano County Hub and the Tri-Valley Hub, along with half-hourly peak and hourly off-peak service to and from the Pleasanton ACE Station.

The hourly and half-hourly pulse headways for the corridor buses will facilitate connections to the *Capitol Corridor* and *San Joaquins* services in the mid- and long-term, as well as to SMART services reaching the Solano County Hub in the long-term.

4.2 High Level Service Concept

Given the goals, improvements, and planning efforts set forth above, it is possible to construct alternative I-680 Express Bus service concepts for the near-term (circa 2022), mid-term (2027), and long-term (2040). There are two alternatives for each of the three time horizons. Route Concept A assumes the Dublin/Pleasanton BART Station as the Tri-Valley Hub. Route Concept B assumes the West Dublin/Pleasanton BART Station as the Tri-Valley Hub. **Figure 13** below illustrates the route concepts in a geographic context. Pacheco PNR and Pleasant Hill/Contra Costa Centre BART could be alternatives to Martinez Amtrak and Walnut Creek BART respectively. The routing concepts that follow assume a Martinez stop, bypassing Pacheco PNR. If Pacheco PNR were to be selected over Martinez, a dedicated shuttle with timed transfers could connect riders to Amtrak services at Martinez, as discussed in Chapter 5.

Figure 13. High Level Service Concept Map



4.2.1 Near-term (Circa 2022) Operating Concepts

Route Concept A:

- AM hourly departures southbound from the Suisun Amtrak (future Solano County Hub) with stops at Martinez Amtrak, Walnut Creek BART (or Pleasant Hill/Contra Costa Centre BART), Bollinger Canyon PNR, and Dublin/Pleasanton BART.
- During commute periods, buses continue to Pleasanton ACE for a connection with inbound ACE trains for furtherance to South Bay work centers. Buses timed to make the ACE connections.
- After a short rest at the southern terminus, buses return to Suisun.
- PM northbound departures timed to meet ACE arrivals at Pleasanton. The route can be seen in **Figure 14.**

Route Concept B:

- Same, but with West Dublin/Pleasanton BART replacing Dublin/Pleasanton BART as the principal Tri-Valley stop. The route can be seen in **Figure 15.**

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Figure 14. Route Concept A

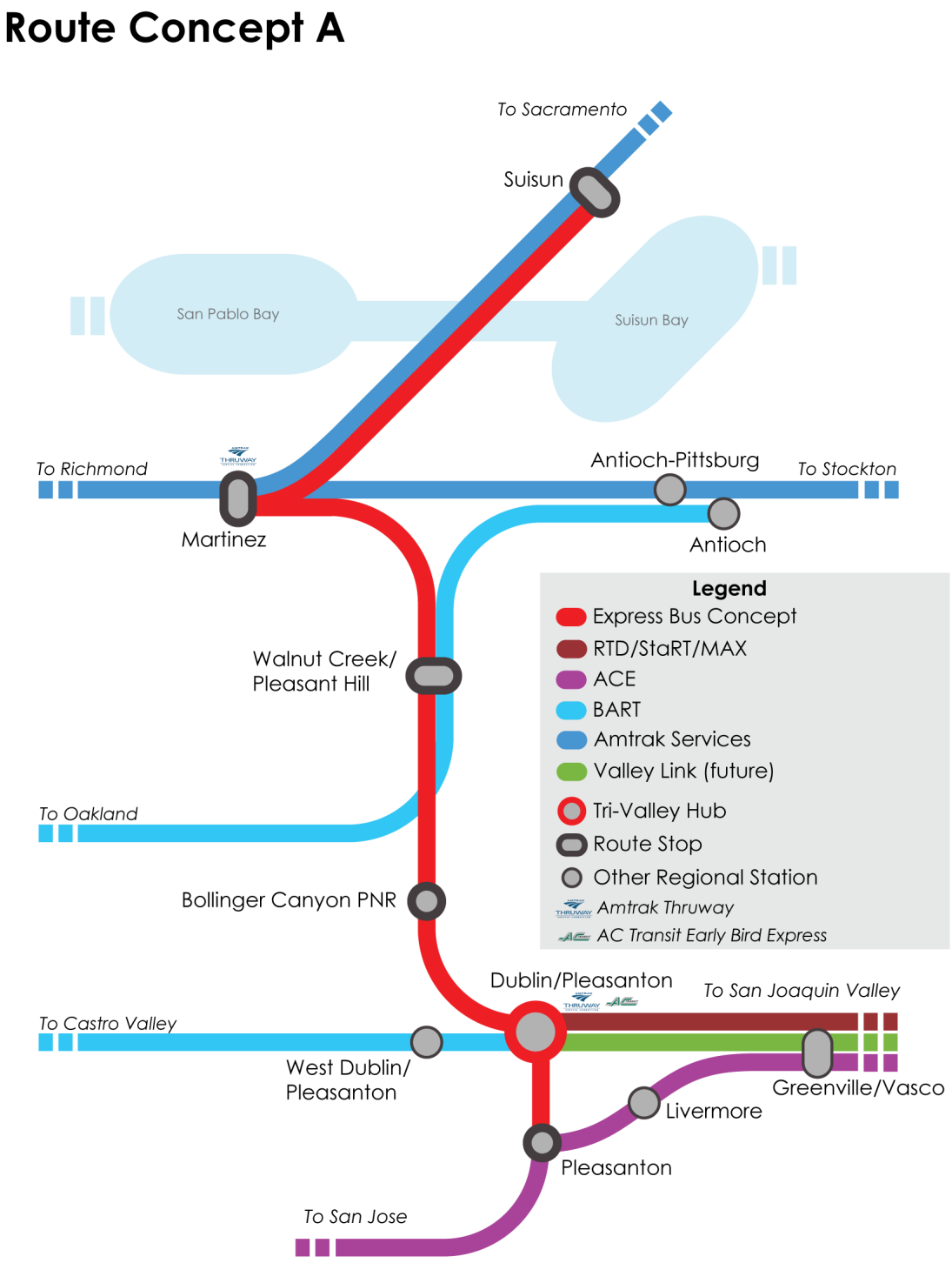
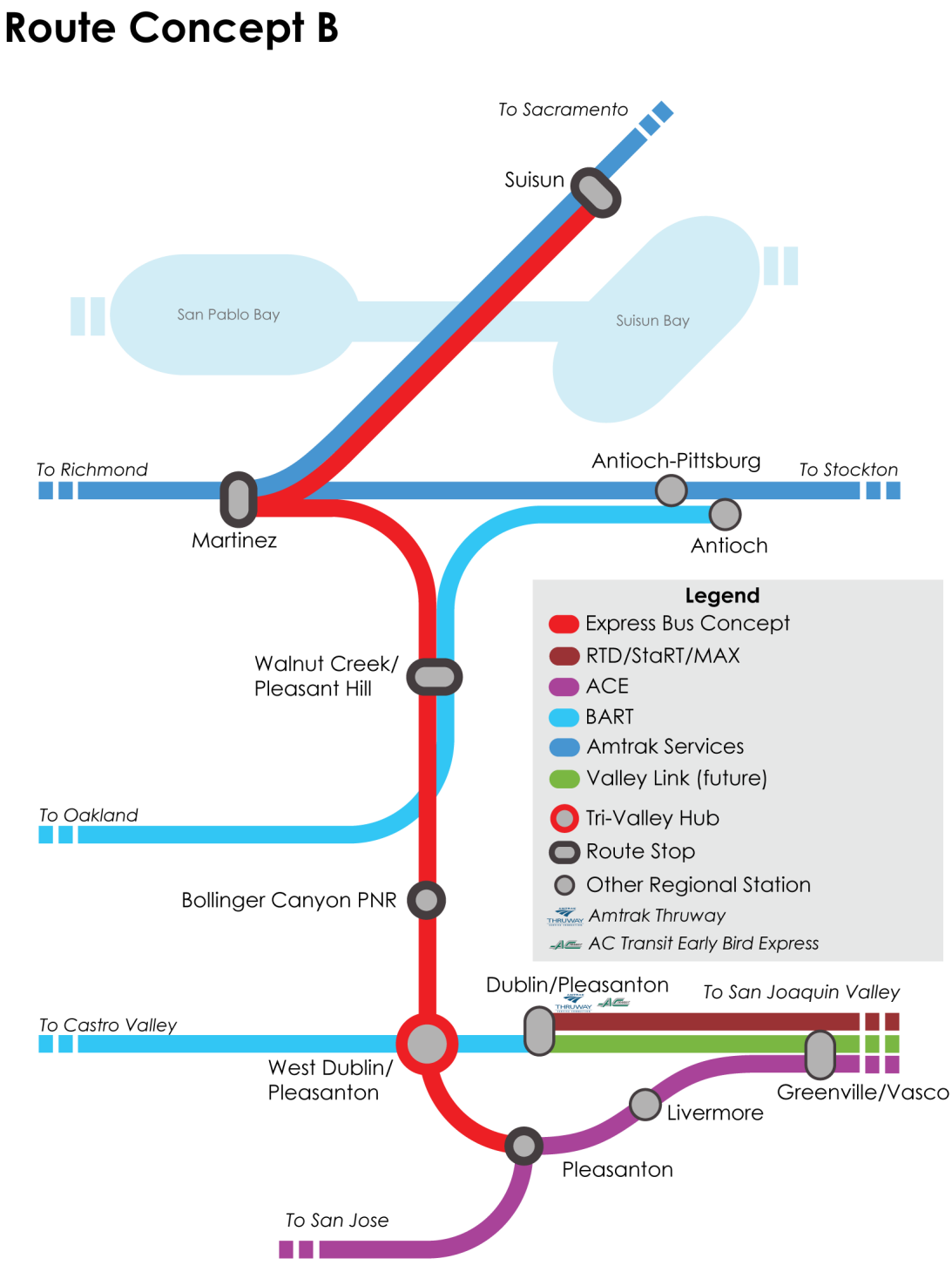


Figure 15. Route Concept B



4.2.2 Mid-term (Circa 2027) Operating Concepts

Route Concept A:

- AM half-hourly peak and hourly off-peak departures southbound from Suisun with stops at Martinez Amtrak, Walnut Creek BART (or Pleasant Hill/Contra Costa Centre BART), Bollinger PNR, and Dublin/Pleasanton BART, identified as the official Tri-Valley Hub.
- During commute periods, buses continue to Pleasanton ACE for a connection with inbound ACE trains for furtherance to South Bay work centers.
- After a short rest at the southern terminus, buses return to Suisun.
- PM northbound departures timed to meet ACE arrivals.
- Valley Link initiates service to and from Dublin/Pleasanton BART Station.

Route Concept B

- Same, with West Dublin/Pleasanton BART replacing Dublin/Pleasanton as the Tri-Valley Hub.

4.2.3 Long-term (Circa 2040) Operating Concepts

Route Concept A:

- AM half-hourly departures southbound from Suisun with stops at Martinez, Walnut Creek BART (or Pleasant Hill/Contra Costa Centre BART), Bollinger Canyon PNR, and Dublin/Pleasanton BART.
- Buses continue to Pleasanton ACE for a connection with inbound ACE trains on half-hourly peak and hourly off-peak frequencies for furtherance to South Bay work centers.
- After a short rest at the southern terminus, buses return to Suisun.
- PM northbound departures time to meet ACE arrivals.

Route Concept B:

- Same, with West Dublin/Pleasanton BART replacing Dublin/Pleasanton BART as the Tri-Valley Hub.

4.2.4 Travel Demand

The 2018 *California State Rail Plan* points to significant, growing travel demand served in part by the I-680 and the I-580 in the study area. For example, the corridors between Sacramento and the San Francisco Bay Area and between the Bay Area and the Northern San Joaquin Valley saw 42.3 million and 31.2 million annual trips respectively in 2010. These trips will increase 74 percent and 57 percent respectively by 2040.

Furthermore, the CCJPA's 2018 *Travel Demand Analysis* memo uncovered 7.7 million trips per month in 2015 between the I-680 corridor communities and Sacramento/Davis; and 16.4 million trips per month between northern San Joaquin Valley communities and the Mid-San Francisco Peninsula. The former travel market could be served by transit improvements on I-680; and the latter by enhanced ACE service along with a proposed, connecting with future Dumbarton Rail Corridor service linking Union City and Fremont/Centerville with Menlo Park and Redwood City.

The 2019 *Valley Link Project Feasibility Report* pointed to the potential for 26,000 to 28,000 weekday riders (6.6 million to 7.1 million annual riders) for this new regional rail service linking Lathrop and Tracy with BART in Pleasanton by 2040 – a route which is served today by the RTD's route 150 commuter bus service.

Lastly, the ongoing Alameda CTC's *I-680 Corridor Transit Operations Concept* memo pointed to a potential of almost 2,000 weekday riders (500,000 annual riders) on a conceptualized I-680 corridor Express Bus service linking Martinez in the north with San Jose Diridon Station in the south.

While these four data points were calculated separately, by different methods and for unique purposes, they all nevertheless indicate a travel demand for public transit services linking I-680 and I-580 communities with Sacramento, the South Bay, and the Mid-Peninsula. These are travel markets that an I-680 Express Bus service and a Tri-Valley Hub could help serve.

4.2.5 Run Times

Estimated run times for an I-680 Express Bus are presented below. Run times were approximated under the assumption that the I-680 Express Bus service would utilize I-680 express lanes being implemented by the Alameda CTC on those segments which either already have express lanes in operation or are planned to have express lanes open by 2022, when the service is being planned to initiate in the near-term. The analysis calculates run times assuming four permutations: a Tri-Valley Hub at West Dublin/Pleasanton BART or Dublin/Pleasanton BART, and a stop at Pleasant Hill/Contra Costa Centre BART or Walnut Creek BART. Run times were based on traffic data gathered in 2020.

Segments of the proposed service corridor that will have express lanes open by 2022 include the following:

- Westbound I-80 between the SR 12/I-80 interchange and the I-80/I-680 interchange.
- Southbound I-680 between Marina Vista Avenue in Martinez and Alcosta Boulevard in San Ramon.
- Westbound I-580 between Dublin/Pleasanton BART Station and West Dublin/Pleasanton BART Station.
- Northbound I-680 between Alcosta Boulevard in San Ramon and Livorna Road in Walnut Creek.

Run times assume a minimum speed of 45 miles per hour (mph) on express lane segments, per Federal Highway Administration (FHWA) [25] requirements. Express Lanes are planned to utilize dynamic pricing to ensure that the average speed through the corridor does not go below 45 mph.

Estimates of run times for an I-680 Express Bus in the near-term are presented in **Table 7**. The table shows run times assuming either a mid-route stop at Pleasant Hill/Contra Costa Centre BART or at Walnut Creek BART (all other stops are common stops); and assuming a Tri-Valley Hub at Dublin/Pleasanton BART or at West Dublin/Pleasanton BART. Run times are calculated for the peak and off-peak periods northbound and southbound.

For the purpose of the run time analysis, a stop at Martinez Amtrak is assumed rather than the alternative stop at Pacheco PNR. A stop at the latter would require a timed transfer to a dedicated shuttle to and from Martinez Amtrak, resulting in longer transit times for riders.

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[25] Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Facility Lanes

Table 7. Express Bus Estimated Run Times

Estimated Run Time (minutes)			
	Segment	**Tri-Valley Hub: Dublin/Pleasanton BART Station**	**Tri-Valley Hub: West Dublin/Pleasanton BART Station**
Southbound Peak Period (6:00-9:00 a.m.)	**Via Pleasant Hill**		
	Suisun-Fairfield Amtrak Station to Martinez Amtrak Station	35	35
	Martinez Amtrak Station to Pleasant Hill/Contra Costa Centre BART Station	24	24
	Pleasant Hill/Contra Costa Centre BART Station to Bollinger Canyon PNR	20	20
	Bollinger Canyon PNR to Tri-Valley Hub	14	9
	Tri-Valley Hub to ACE Pleasanton Station	19	17
	Total - Suisun-Fairfield Amtrak Station to ACE Pleasanton Station	***112***	***105***
	Via Walnut Creek		
	Suisun-Fairfield Amtrak Station to Martinez Amtrak Station	36	36
	Martinez Amtrak Station to Walnut Creek BART Station	25	25
	Walnut Creek BART Station to Bollinger Canyon PNR	18	18
	Bollinger Canyon PNR to Tri-Valley Hub	14	9
	Tri-Valley Hub to ACE Pleasanton Station	19	17
	Total - Suisun-Fairfield Amtrak Station to ACE Pleasanton Station	***112***	***105***
Southbound Off-Peak Period (after 9:00 a.m.)	**Via Pleasant Hill**		
	Suisun-Fairfield Amtrak Station to Martinez Amtrak Station	31	31
	Martinez Amtrak Station to Pleasant Hill/Contra Costa Centre BART Station	21	21
	Pleasant Hill/Contra Costa Centre BART Station to Bollinger Canyon PNR	22	22
	Bollinger Canyon PNR to Tri-Valley Hub	14	9
	Tri-Valley Hub to ACE Pleasanton Station	15	10
	Total - Suisun-Fairfield Amtrak Station to ACE Pleasanton Station	***103***	***93***
	Via Walnut Creek		
	Suisun-Fairfield Amtrak Station to Martinez Amtrak Station	31	31
	Martinez Amtrak Station to Walnut Creek BART Station	22	22
	Walnut Creek BART Station to Bollinger Canyon PNR	18	18
	Bollinger Canyon PNR to Tri-Valley Hub	14	9
	Tri-Valley Hub to ACE Pleasanton Station	15	10
	Total - Suisun-Fairfield Amtrak Station to ACE Pleasanton Station	***100***	***90***

Estimated Run Time (minutes)			
	Segment	**Tri-Valley Hub: Dublin/Pleasanton BART Station**	**Tri-Valley Hub: West Dublin/Pleasanton BART Station**
Northbound Peak Period (4:00-7:00 p.m.)	**Via Pleasant Hill**		
	ACE Pleasanton to Tri-Valley Hub	14	16
	Tri-Valley Hub to Bollinger Canyon PNR	18	16
	Bollinger Canyon PNR to Pleasant Hill/Contra Costa Centre BART	20	20
	Pleasant Hill/Contra Costa Centre BART Station to Martinez Amtrak Station	23	23
	Martinez Amtrak Station to Suisun-Fairfield Amtrak Station	36	36
	Total - ACE Pleasanton Station to Suisun-Fairfield Amtrak Station	***111***	***111***
	Via Walnut Creek		
	ACE Pleasanton to Tri-Valley Hub	14	16
	Tri-Valley Hub to Bollinger Canyon PNR	18	16
	Bollinger Canyon PNR to Walnut Creek BART	18	18
	Walnut Creek BART Station to Martinez Amtrak Station	34	34
	Martinez Amtrak Station to Suisun-Fairfield Amtrak Station	36	36
	Total - ACE Pleasanton Station to Suisun-Fairfield Amtrak Station	***120***	***120***
Northbound Off-Peak Period (before 4:00 p.m.)	**Via Pleasant Hill**		
	ACE Pleasanton to Tri-Valley Hub	14	11
	Tri-Valley Hub to Bollinger Canyon PNR	18	16
	Bollinger Canyon PNR to Pleasant Hill/Contra Costa Centre BART	20	20
	Pleasant Hill/Contra Costa Centre BART Station to Martinez Amtrak Station	16	16
	Martinez Amtrak Station to Suisun-Fairfield Amtrak Station	31	31
	Total - ACE Pleasanton Station to Suisun-Fairfield Amtrak Station	***99***	***94***
	Via Walnut Creek		
	ACE Pleasanton to Tri-Valley Hub	14	11
	Tri-Valley Hub to Bollinger Canyon PNR	18	16
	Bollinger Canyon PNR to Walnut Creek BART	18	18
	Walnut Creek BART Station to Martinez Amtrak Station	20	20
	Martinez Amtrak Station to Suisun-Fairfield Amtrak Station	31	31
	Total - ACE Pleasanton Station to Suisun-Fairfield Amtrak Station	***101***	***96***

Source: Google Maps Trip Planner

4.2.6 Connections

- With the exception of the Bollinger Canyon Park-and-Ride, the proposed I-680 Express Bus stops provide a plethora of rail and transit connections, noted as follows: The Suisun-Fairfield Amtrak Station currently provides connections to *Capitol Corridor* rail service, as well as five bus routes from SolanoExpress, VINE, FAST, and Delta Breeze services.
- The Martinez Amtrak Station provides connections to *Capitol Corridor* and *San Joaquins* trains, two Amtrak long-distance rail services, Amtrak Thruway bus service, and nine other local bus routes via Tri-Delta Transit, WestCAT, and County Connection.
- The Pleasant Hill/Contra Costa Centre BART Station provides connections to the BART Yellow Line rapid transit rail service, as well as 13 local bus routes from Solano Express, AC Transit, County Connection, and Wheels.
- The Walnut Creek BART Station provides connections to the BART Yellow Line rapid transit rail service, and 16 different bus routes from Wheels, Solano Express, and County Connection.
- The West Dublin/Pleasanton BART Station provides connections to the BART Blue Line rapid transit rail service, and three local bus routes from Wheels.
- The Dublin/Pleasanton BART Station provides connections to the BART Blue Line rapid transit rail service; Amtrak Thruway bus service; 16 different local bus routes from County Connection, Wheels, and AC Transit; and three long-distance commuter routes operated by Stanislaus Regional Transit, Modesto Area Express, and San Joaquin RTD.
- The Pleasanton ACE Station provides connections to ACE rail service and three local bus routes from Wheels and County Connection.

Appendix D includes a table of all bus and rail connections that are currently made at each of the potential I-680 Express Bus stops.

4.3 Pros and Cons of the Alternative Tri-Valley Hub Locations

While there are three candidates for a Tri-Valley Hub, there is one clear winner for a Tri-Valley Hub: Dublin/Pleasanton BART. The deciding factors are the multiplicity of existing and future transit connections and the availability of bus and auto parking. Accordingly, this study assumes Dublin/Pleasanton BART as the Tri-Valley Hub for the reasons noted below. The pros and cons of the lesser candidates are discussed below as well.

Dublin/Pleasanton BART

A major advantage of Dublin/Pleasanton BART is County Connection and Wheels routes go there now, along with multiple other transit operators, and that Valley Link will go there in the future, in addition to BART service. With these routes an I-680 Express Bus service will have more connections, making this location a potentially highly effective Tri-Valley Hub. On the other hand, Dublin/Pleasanton BART has more demand for bus bay space. However, operators seem to prefer to use the Dublin (north side) 10 bays rather than the Pleasanton (south side) five bays. So, there is some room for an I-680 Express Bus stop and layover. And with a planned garage at the site open potentially for non-BART riders, parking for the I-680 Express Bus service should not be a constraint. The above noted, reaching Pleasanton ACE is more circuitous from Dublin/Pleasanton BART via city streets and takes longer than from West Dublin/Pleasanton BART.

West Dublin/Pleasanton BART

A major advantage of West Dublin/Pleasanton BART as the Tri-Valley Hub is the availability of bus stops. The northside of the station has five bus stops which go mostly unused throughout the day. So, there is room for the Express Bus service to stop and layover there. However, auto parking is constrained at this site. Extending the bus service to Pleasanton ACE is relatively quick and simple via I-680.

Pleasanton ACE

A Tri-Valley Hub here would provide access to both a future Stockton Area Hub and a future East Bay Hub in ways that are superior to the West Dublin/Pleasanton BART and Dublin/Pleasanton BART. That is, ACE could connect all three hubs. However, there would be no access to BART except by connecting bus.

Chapter 5 - Ridership Forecasts

This chapter includes ridership forecasts for bi-directional Express Bus service along the I-680 corridor that connects Suisun-Fairfield Amtrak station with the Tri-Valley Hub located at the Dublin/Pleasanton BART Station. The Express Bus service and a proposed Tri-Valley transit hub are intended to improve connections to and expand the coverage of the California statewide rail system within the I-680 corridor. This chapter includes the methodology used to generate the Express Bus ridership forecasts and presents the forecasts for several build alternatives. The ridership forecasts were the basis for settling on the best locations for Express Bus stations within the I-680 corridor.

The chapter also includes assessment of the ridership potential for two other service concepts: an express bus between the Tri-Valley Hub and Modesto and increased frequency of San Joaquin Regional Transit District Route 150 service.

5.1 Ridership Methodology

The I-680 Express Bus ridership forecasts were generated using two travel demand models: (1) the Altamont Corridor Express Passenger Rail Forecasting Model (ACE Model), and (2) a version of the Alameda County Transportation Commission travel demand forecasting model (Alameda CTC Model), which have different strengths related to the concepts to be tested. These tools are described in the sections below.

Ridership for a Tri-Valley Hub-Modesto express bus concept was also tested using the ACE Model. The ridership assessment for an expansion of RTD Route 150 service employed a conceptual approach described in a subsequent section of this chapter.

5.1.1 ACE Model

AECOM developed and has used the ACE Model to forecast ridership for recent and ongoing plans and projects to implement service improvements to ACE and *San Joaquins* services, including the ACE*forward* program and the ACE Sacramento Extension. The ACE Model accounts for both intercity and commuter passengers. It is based on the Amtrak forecasting model developed by AECOM. The ACE Model has been calibrated to match existing ACE ridership and updated to account for future short- and long-term investments in the passenger rail network in Northern California, including connections with statewide high-speed rail and select connections with BART.

5.1.2 Alameda CTC Model

The Alameda CTC Model is the countywide transportation planning model for use within Alameda County. Like the other countywide models in use within the nine-county San Francisco Bay Area, the Alameda CTC Model is consistent with the regional travel demand forecasting models maintained by the Metropolitan Transportation Commission, as well as the land use and socio-economic database maintained by the Association of Bay Area Governments. The model version used for this ridership analysis is from the 2018 Alameda CTC Model update.

5.1.3 Two-Tier Modeling Approach for the I-680 Express Bus Forecasts

This analysis examines questions both at the local level, such as which BART station provides better ridership as a stop location for the Express Bus service, and at the broader regional level, such as how to best connect to the state rail network. For this analysis, AECOM utilized the available tools in a tiered approach to take advantage of the strengths of each model.

The Alameda CTC Model has a fine level of detail within the I-680 corridor and can provide ridership changes due to station stop locations at Pleasant Hill/Contra Costa Centre BART and/or Walnut Creek BART stations. However, the Alameda CTC Model cannot provide connections to the state rail system and Amtrak services. In contrast, the ACE Model has a greater geographic coverage and also connections to the state rail system, but the ACE Model does not have a detailed station access process and thus would not be able to appropriately distinguish between the two BART stations/locations. Additionally, the Alameda CTC Model includes demographics only for years 2020 and 2040, while the ACE Model has demographics for every year until 2041.

Given the strengths of each model, AECOM initially applied the Alameda CTC Model to test the Express Bus station locations for co-locating with BART. The better location for connecting to BART (either Pleasant Hill/Contra Costa Centre BART or Walnut Creek BART) was selected after a review of the initial Alameda CTC Model 2040 ridership results. The ACE Model then was run on a reduced set of alternatives that included the better connecting station. The ACE Model was applied to test the transfer connections to ACE and Amtrak (*San Joaquins* and *Capitol Corridor* services) and forecast the final total ridership on the Express Bus route. The outputs include annual station boardings and alightings, as well as transfers to/from the state rail system for three years of analysis: 2022, 2027, and 2040.

5.2 Ridership Forecasts

This section presents the ridership forecasts for three different service concepts:

- I-680 Alternatives for Express Buses operating between Suisun-Fairfield Amtrak station (the presumed Solano County Hub identified in the 2018 *California State Rail Plan*) and the Dublin/Pleasanton BART Station, also known as the Tri-Valley Hub, for most of the day. Service would extend to the Pleasanton ACE Station during commute periods.
- A Tri-Valley Hub-Modesto express bus service, providing Tri-Valley residents with a connection to the San Joaquins with less out-of-direction travel to and from Martinez.
- Additionally, the potential of a near-term, expanded RTD Route 150 service linking Stockton, Lathrop, and Tracy with the Tri-Valley Hub at the Dublin/Pleasanton BART Station is assessed.

5.2.1 Ridership for the I-680 Alternatives

Six Express Bus build alternatives and corresponding ridership forecasts are presented below. Initial forecast Alameda CTC Model ridership results for 2040 are presented in addition to the forecast ACE Model final ridership results for years 2022, 2027, and 2040.

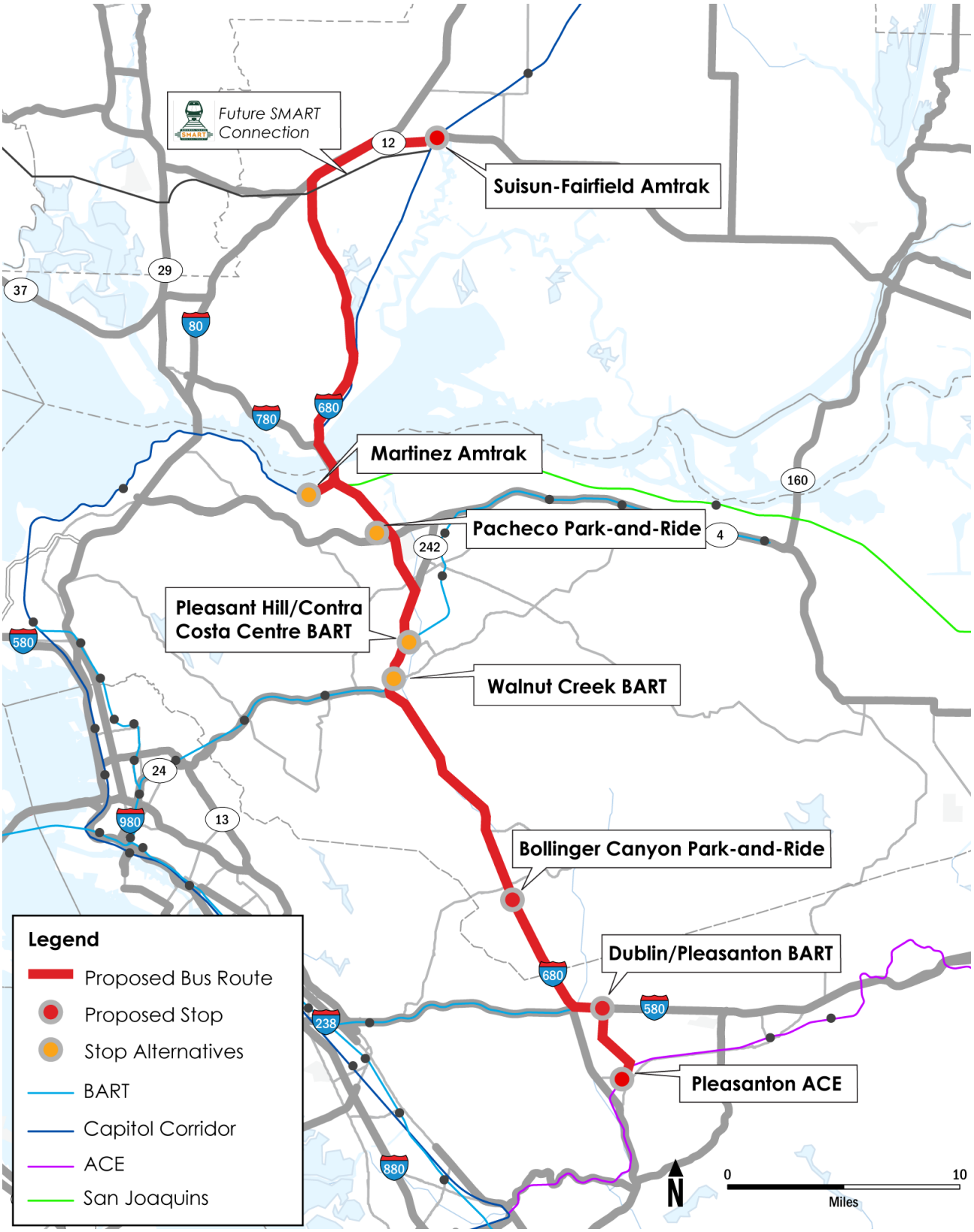
The stops that are part of each alternative are shown below in **Table 8** and are shown on **Figure 16**. Each alternative includes service that runs from Suisun-Fairfield Amtrak station to the Pleasanton ACE Station with intermediate stops at Bollinger Park-and Ride and the Dublin/Pleasanton BART Station. Differences among alternatives exist due to the presence of stops at Martinez, Pacheco PNR, Pleasant Hill/Contra Costa Centre BART, and/or Walnut Creek BART.

There are two variations in the BART station stopping pattern, with Alternatives 1, 3, and 5 stopping at Pleasant Hill/Contra Costa Centre BART and Alternatives 2, 4, and 6 stopping at Walnut Creek BART. The Amtrak station connections have three variations, with Alternative 1 and 2 stopping at both Suisun-Fairfield and Martinez. Alternatives 3 and 4 replace the Martinez Amtrak Station stop with one at the nearby Pacheco PNR, with a timed shuttle bus between Pacheco and Martinez. Alternatives 5 and 6 do not have a stop at either the Martinez Amtrak Station or the Pacheco PNR, and, therefore, do not connect to the *San Joaquins* service at all.

Table 8. I-680 Express Bus Stops in Each Alternative

Stops	1	2	3	4	5	6
Suisun-Fairfield Amtrak	X	X	X	X	X	X
Martinez Amtrak	X	X				
Pacheco PNR			X	X		
Pleasant Hill/Contra Costa Centre BART	X		X		X	
Walnut Creek BART		X		X		X
Bollinger PNR	X	X	X	X	X	X
Dublin/Pleasanton BART	X	X	X	X	X	X
Pleasanton ACE	X	X	X	X	X	X

Figure 16. I-680 Express Bus Route and Potential Stops



Express Bus headways depend on the forecast year and time of day, as shown in **Table 9** below. These headways are representative service plans as noted in the 2018 *California State Rail Plan*. They are not optimized in terms of ridership loading or timed connections to other services, but they are intended to be representative service plans for comparing ridership across alternatives.

Table 9. Express Bus Service Headways (minutes) by Forecast Year and Period

Year	Peak	Off-Peak
2022	45 - 60	45 - 60
2027	30	45 - 60
2040	30	30

Applying the Two-Tier Ridership Forecasting Approach

The first step of the tiered approach was to use the Alameda CTC Model to forecast 2040 ridership for the six alternatives specified in Table 8. As the Alameda CTC Model does not include a full representation of connections to the state rail network, the forecasted ridership from the Alameda CTC Model was used determine the optimal stopping pattern based on local travel and connections to the BART network.

The Alameda CTC Model initial results for the 2040 average daily boardings for the six alternatives are presented in **Table 10**. Note that Alternatives 1, 3, and 5 include the Pleasant Hill/Contra Costa Centre BART Station, while Alternatives 2, 4, and 6 include the Walnut Creek BART Station. The alternatives with Walnut Creek BART have higher daily ridership relative to the corresponding alternatives with Pleasant Hill/Contra Costa Centre BART. Because of this outcome, the analysis was able to determine that the Walnut Creek BART Station was the better location for an Express Bus stop and applied the ACE Model only to the alternatives with Walnut Creek (i.e., Alternatives 2, 4, and 6).

Table 10. Initial Results* Alameda CTC Model 2040 Average Daily Boardings – I-680 Express Bus Alternatives

Stops	1	2	3	4	5	6
Suisun-Fairfield Amtrak	94	86	93	86	92	85
Martinez Amtrak	122	75	-	-	-	-
Pacheco PNR	-	-	162	127	-	-
Pleasant Hill/Contra Costa Centre BART	276	-	296	-	175	-
Walnut Creek BART	-	397	-	415	-	341
Bollinger PNR	356	390	357	389	352	386
ED/Pleasanton BART	383	484	399	491	378	478
Pleasanton ACE	112	125	113	125	111	123
Total Ridership	*1,343*	*1,555*	*1,419*	*1,632*	*1,107*	*1,412*

*These are not the final forecast ridership numbers, because they do not include the connections to the state rail network and were only used to determine the mid-route BART station location for the Express Bus stop.

The second step of the tiered modeling approach was to then run the ACE Model on the selected alternatives to determine the final ridership forecast and the best locations for connecting to the state rail network. The ACE Model ridership results are presented in **Table 11** for years 2022, 2027, and 2040. Alternative 2 has the highest daily boardings in each forecast year, as it provides the most direct connection to both the *Capitol Corridor* and *San Joaquins* services. Alternative 4 maintains a connection to both services, but instead of a stop at the Martinez Station, offering a direct connection to the *San Joaquins*, it stops at the nearby Pacheco PNR, with a timed shuttle service to the Martinez Station. This alternative still sees connections to Amtrak, but not as many, as it is now a three-seat ride instead of only one connection. Alternative 6 only connects to

Amtrak at Suisun-Fairfield, which serves the *Capitol Corridor* trains, but not the *San Joaquins*, and, therefore, sees the lowest amount of ridership of the three alternatives in 2027 and 2040, and well below Alternative 2 in 2022.

Table 11. ACE Model Average Daily Boardings for Alternatives 2, 4, and 6 for Years 2022, 2027, and 2040

	2022			2027			2040		
Stops	**2**	**4**	**6**	**2**	**4**	**6**	**2**	**4**	**6**
Suisun-Fairfield Amtrak	125	110	160	175	205	195	195	270	250
Martinez Amtrak	205	-	-	260	-	-	280	-	-
Pacheco PNR	-	65	-	-	185	-	-	235	-
Walnut Creek BART	295	185	225	375	300	305	435	420	435
Bollinger PNR	255	180	200	330	275	275	405	395	390
ED/Pleasanton BART	105	70	85	145	120	130	185	185	180
Pleasanton ACE	310	185	210	350	285	250	385	355	315
Total Ridership	*1,295*	*795*	*880*	*1,635*	*1,370*	*1,155*	*1,885*	*1,860*	*1,570*

Table 12 below presents the number of average daily new riders in each alternative for each forecast year. New riders are entirely new to transit and are not switching from another transit mode. Alternative 2 is forecasted to have the highest number of new riders in 2022 and 2027, and Alternative 4 is forecasted to narrowly have the most new riders in 2040.

Table 12. ACE Model Average Daily New Riders

Year	2	4	6
2022	748	491	533
2027	945	846	700
2040	1,089	1,149	951

Table 13 shows the number of daily one-way trips and average number of riders per bus for the near-, mid-, and long-term forecasts, indicating the level of passenger load that could be anticipated. These are estimates based on initial service plans; they are not optimized, but instead are intended to show that reasonable loads could be anticipated given the ridership forecast and initial service plans, with approximately 40 riders per bus in the alternative with the highest ridership for Years 2022 and 2027. For 2040, the frequency of service increases (potentially as high as 64 daily trips) at a greater rate compared to ridership. The result of such a high number of trips would be to lower average ridership per bus compared to figures in earlier forecast years. Accordingly, a strategic decision was made about the frequency of service in 2040: some trips were eliminated, particularly during the off-peak period, thus improving the average ridership per bus. It is assumed that the bus trips eliminated, given their timing, would not sacrifice much, if any, ridership.

Table 13. ACE Model Daily Average Riders Per Bus

	2022			2027			2040		
Stops	**2**	**4**	**6**	**2**	**4**	**6**	**2**	**4**	**6**
Total Ridership	1,295	795	880	1,635	1,370	1,155	1,885	1,860	1,570
Number of Trips	34	34	34	42	42	42	50	50	50
Ave Ridership per Bus*	38	24	26	39	33	28	38	38	32

**Rounded up to the nearest rider*

Table 14 below shows the daily vehicle miles traveled (VMT) avoided, which is an estimate of auto travel that would otherwise occur without the proposed bus service, and the daily passenger miles traveled (PMT), which is the distance the bus riders travel on the bus. Both the daily VMT avoided and the daily PMT are affected by the average trip length, which is in turn affected by the stopping pattern of each alternative. Generally, the daily VMT avoided and the daily PMT vary with the

total ridership. Alternative 2, which has the highest forecasted ridership in Years 2022 and 2027, also is forecasted to have the highest VMT avoided and PMT in 2022 and 2027. Alternative 4, which is forecasted to have nearly the highest ridership in 2040, is forecasted to have the highest VMT avoided and PMT in 2040 relative to the other two alternatives.

Table 14. ACE Model Average VMT Avoided and PMT

	2022			2027			2040		
Stops	**2**	**4**	**6**	**2**	**4**	**6**	**2**	**4**	**6**
Ave Daily Total VMT Avoided	33,300	28,700	27,800	35,000	31,300	30,100	37,100	39,400	37,500
Ave Daily Total PMT	43,290	37,310	36,140	45,500	40,690	39,130	48,230	51,220	48,750

The effect of running higher frequencies in 2022 was also tested. This last model run assumed 2027 frequencies and 2022 demographics. The results appear in **Table 15** as 2022a for Alternatives 2, 4, and 6. As can be seen, Alternative 2 gets a little more ridership than before, but not a lot more. Interestingly, Alternatives 4 and 6 do much better. In fact, there is not a lot of difference between the three alternatives in the 2022a model run. The half hourly peak frequencies help ridership in Alternatives 4 and 6: a result of better connections to other services (BART, ACE, *Capitol Corridor* and *San Joaquins*).

Table 15. Ridership with Higher Frequencies in 2022

Year	2	4	6
2022	1,295	795	880
2022a	1,345	1,225	1,145
Difference	50	430	265

Lastly, the impact of running 15-minute frequencies during the peak period in 2022 assuming Alternative 2 was tested. The model run showed the 15-minunte peak frequencies for that alternative would yield 1,370 riders per weekday, just slightly higher than the results for 2022 and 2022a model runs noted in Table 15.

It is worth noting that BART will be moving to 12-minute headways in the future, minimizing the potential wait times at Walnut Creek BART for I-680 Express Bus transfers.

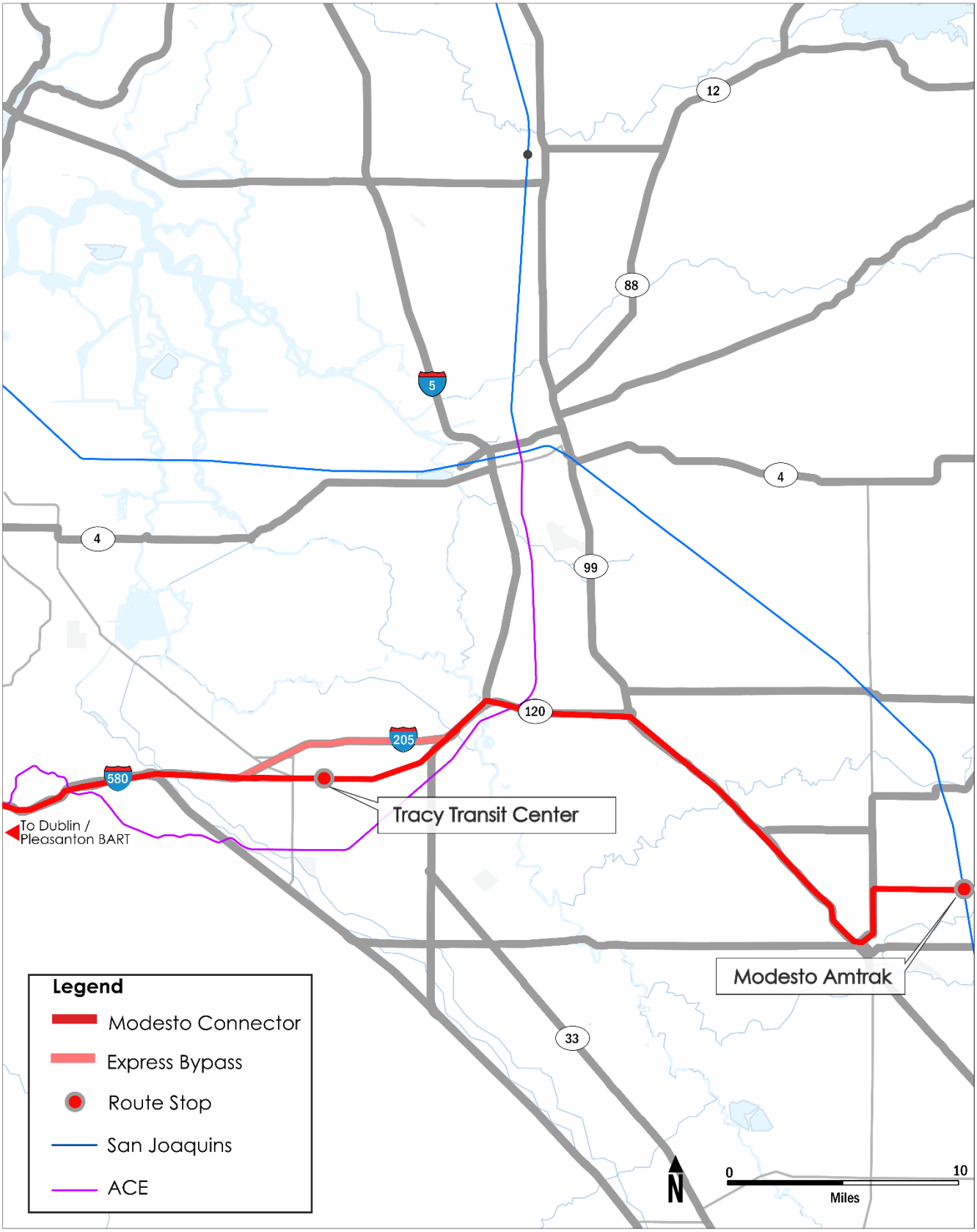
A travel time analysis, comparing the Express Bus runtimes versus other modes in the I-680 corridor, appears as **Appendix E**.

5.2.4 Ridership for Tri-Valley Hub-Modesto Express Buses

In addition to the six build alternatives for the I-680 Express Bus service, AECOM used the ACE Model to forecast ridership for an Alternative 7, which is a Modesto Connector bus service that would run from the Tri-Valley Hub at the Dublin/Pleasanton BART Station to Modesto, similar to Amtrak Thruway bus service between Dublin/Pleasanton BART and Stockton but avoiding out-of-direction travel to *San Joaquins* going to and from Fresno and Bakersfield. As seen in **Figure 17**, Alternative 7 includes two options: one option with an intermediate stop at Tracy Transit Center (TTC) and the other option without an intermediate stop.

Daily ridership for Alternative 7 was forecasted to be very low for both options considered (with and without an intermediate stop at Tracy Transit Center). The forecasted average daily ridership without the TTC stop ranged from 30 daily riders in 2022 to 50 daily riders in 2040. The forecasted average daily ridership including the TTC stop had a range of 80 daily riders in 2022 to 120 daily riders in 2040. Due to the low ridership, Alternative 7 merits no further study.

Figure 17. Alternative 7: Tri-Valley Hub-Modesto Service



5.2.5 Ridership Assessment for the Expanded RTD Route 150 Service

Existing Route 150 service has 16 trips. As seen in **Figure 18**, its five stops are the Stockton Downtown Transit Center, the Michigan/Kirk PNR in Stockton, the Save Mart in Lathrop, the Tracy Transit Center, and the Dublin/Pleasanton BART Station. Runtimes vary from one hour and 30 minutes to two hours. Route 150 operates a reduced service level on Saturday, Sunday, and holidays. Weekday ridership (pre-COVID-19) on the route totals about 74,000 annually. Weekend ridership totals about 4,000 annually.

Ridership for expanded Route 150 service was assessed conceptually. The driving assumption in this approach is that while ridership grows with expansion of service, the ridership growth tends to be smaller as service levels increase [26]. This phenomenon is called a dampened function, essentially an exponential curve, which intercity ridership models commonly incorporate.

A segment of RTD Route 150 runs along I-205, which is being considered for various managed lanes improvements, including bus-only lanes. More details on this project are included in section 7.3.3 under Related Highway Improvements.

5.3 Preliminary Stopping Pattern for I-680 Express Buses

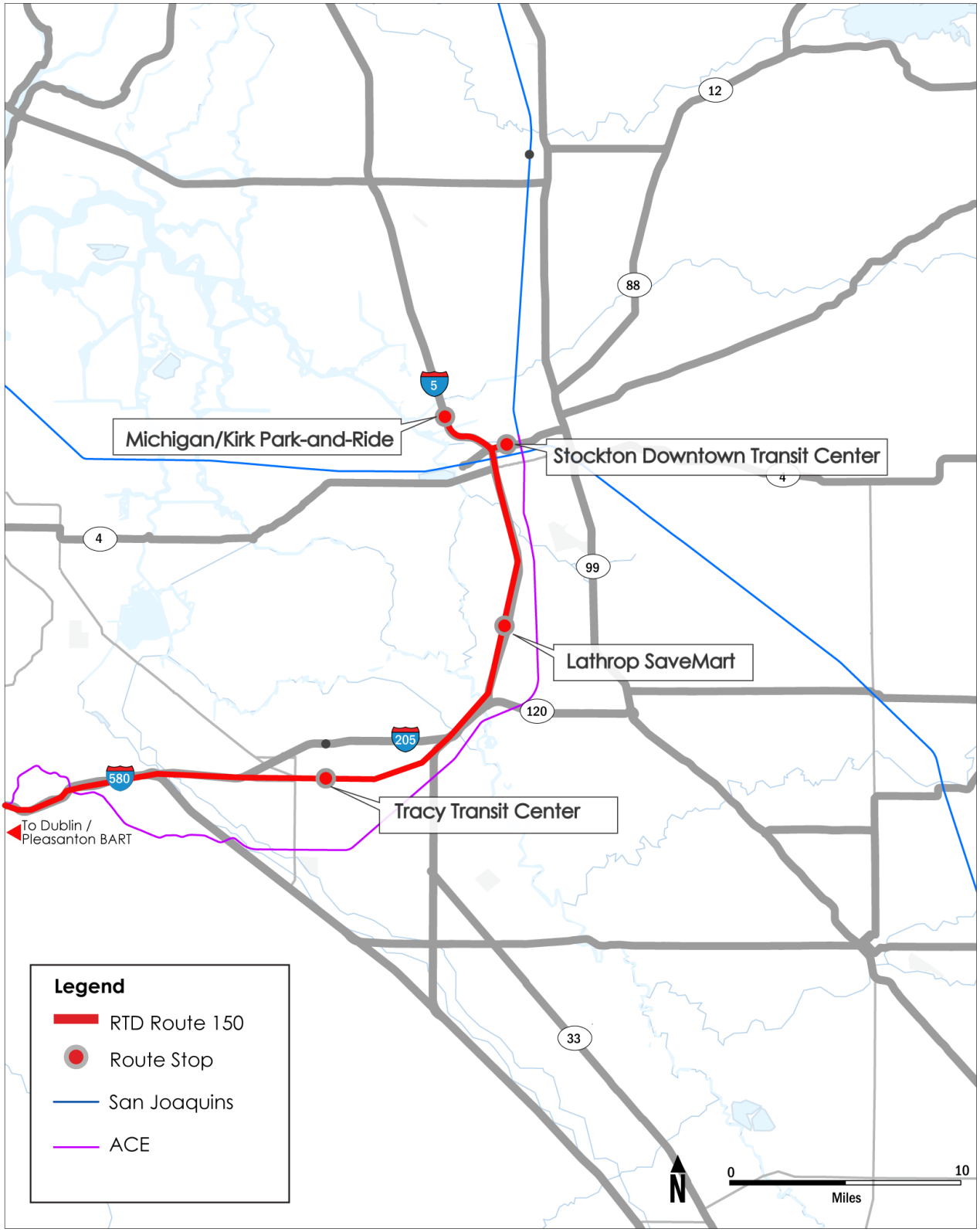
Based on the forgoing analysis, a preliminary stopping pattern for the I-680 Express Bus conceptual service plan was determined. From north to south, these include:

- Suisun-Fairfield Amtrak Station (the presumed Solano County Hub)
- Martinez Amtrak Station
- Walnut Creek BART Station
- Bollinger Canyon PNR
- Dublin/Pleasanton BART Station (Tri-Valley Hub)
- Pleasanton ACE Station (during commute periods)

This stopping pattern for the I-680 corridor Express Buses plus some variations of it are discussed in the next chapter.

[26] Increasing Transit Ridership: Lessons from the Most Successful Transit Systems in the 1990s, MTI Report 01-22, Mineta Transportation Institute, San Jose State University, June 2002, pages 47-48.

Figure 18. RTD Route 150 Service Route



Chapter 6 - Conceptual Service Plan

This chapter summarizes the conceptual service plan for the I-680 Express Buses. The summary includes a discussion of the route, equipment options, governance options, financial performance, and potential funding sources. With the basic service plan defined, the following narrative posits various options for implementing the service, including a shortened route with buses having a northern terminus of the Martinez Amtrak Station rather than the Suisun Amtrak Station. The pros and cons of these options are assessed. Lastly, the next steps toward implementation are discussed.

6.1 Summary of Conceptual Service Plan

Below is a summary of the conceptual service plan for the I-680 Express Buses, as developed through the preceding chapters. Discussed are route, equipment options, governance options, costs and financial performance, and potential funding sources.

6.1.1 Conceptual Route and Service Characteristics

The northern terminus is the Suisun Amtrak station, a potential candidate for the Solano County Hub noted in the 2018 *California State Rail Plan*. Intermediate stops are at the Martinez Amtrak station, the BART Walnut Creek station, and the Bollinger Canyon Park-and-Ride. In 2022, 14 southbound buses will terminate at the BART Dublin/Pleasanton station, identified as the Tri-Valley Hub. Three buses will continue south to the Pleasanton ACE Station during morning commute hours. The reverse would occur during the evening commute.

The service will provide connections to the *Capitol Corridor* trains at Suisun and Martinez, to the *San Joaquins* at Martinez, and to ACE trains at the Pleasanton ACE Station. The stop at the Bollinger Canyon PNR would provide access to the nearby Bishop Ranch office park.

The service will operate on weekdays. At start-up, the service is envisioned to operate with hourly frequencies northbound and southbound. In 2027, frequencies would be half hourly during the peak commute period and hourly during the off-peak. By 2040, frequencies would be half hourly through the workday. In 2022, the first southbound bus departing Suisun will be at 5:05 AM; and the last northbound bus will arrive at Suisun at 11:50 PM. In 2027, the peak period will include southbound departures from Suisun between 5:55 AM and 9:00 AM, with the northbound peak period departures from ACE Pleasanton between 7:45 AM and 8:45 AM.

End-to-end runtime from north to south will vary between an hour and 15 minutes and two hours and seven minutes, depending on the time of day. Longer runtimes would occur during the peak periods, due to highway congestion and runs to and from the ACE Pleasanton station, making for longer trips.

The service will require, among other things, its own name, logo, and paint scheme for its buses.

If the Central Contra Costa Transit Authority would be the presumed operator of the service, the buses could be maintained at the County Connection maintenance facility in North Concord, pending confirmation by CCCTA as to sufficiency of space, adequacy of infrastructure, and efficiency of operations.

The preliminary routing concept for the Express Bus service was shown earlier as Route Concept A in Figure 13.

The Express Bus service will be similar to the existing Wheels Route 70X, which runs during the weekday commute periods with half hourly frequencies between Dublin/Pleasanton BART, Walnut Creek BART, and Pleasant Hill/Contra Costa Centre BART. However, there are major differences. The Express Bus service will be an all-day service with hourly frequencies and stops at the Bollinger Canyon PNR (serving Bishop Ranch) and the Martinez Amtrak station, which the 70X does not serve. Also, the Express Bus will not stop at Pleasant Hill/Contra Costa Centre. Still, with start-up of the service in 2022, there may be an opportunity to rationalize the two services, with the Express Bus replacing some or all of the 70X's 12 weekday trips.

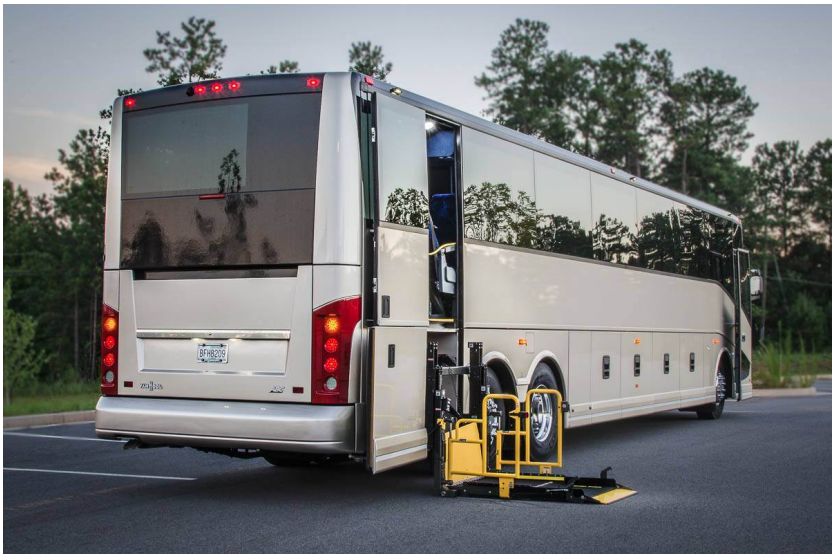
6.1.2 Equipment Options and Acquisition Costs

Various equipment options were explored for the I-680 Express Buses. These include new and used conventional diesel-powered highway motorcoaches, electric buses, and hydrogen fuel cell buses. A total of six buses, including one spare, would be needed for the service at start-up in 2022.

Diesel buses could include those shown in **Figure 18** (Gillig Low Floor Commuter Bus) and **Figure 19 (**a Van Hool Motorcoach). Lead times for manufacture and delivery of new buses can take over a year. Used buses can be acquired with a much shorter lead time. Used buses less than three years old would be optimal versus older buses. The bus images below were obtained from the manufacturers.

Figure 19. Gillig Low Floor Commuter Bus

Figure 20. Van Hool C2045 Motor Coach with ADA Lift



An alternative to diesel buses would be electric buses. One electric bus option is shown in **Figure 20**. Electric buses used in commuter service will require *en route* charging stations, as shown in **Figure 21**. Charging at the *en route* stations would be in addition to charging at an overnight maintenance facility. Images below were obtained from the manufacturers' websites.

Figure 21. Proterra Catalyst 40 Foot Bus

Figure 22. Curbside Charger with Electric Bus

Another alternative would be hydrogen fuel cell buses, as seen in **Figure 23**. Hydrogen buses are deployed by many transit services as a means of achieving greenhouse gas (GHG) emissions reduction targets. These buses require special infrastructure for fueling. The image below obtained from Orange County Transportation Authority website.

Figure 23. Orange County Transportation Authority Hydrogen Fuel Cell Bus

Conceptual capital and annual operations and maintenance (O&M) cost estimates for the aforementioned bus options are summarized in **Table 16**. As noted previously, a total of six buses, including one spare, are needed for the 2022 schedules. The costs for buses, shown in year 2022 dollars, were obtained from MCI, Van Hool, ABC Companies. Diesel O&M costs were based on $3.97 per vehicle mile based on 2018 National Transit Database averages, escalated to year of expenditure dollars, for similar services in the region. Electric O&M costs were assumed to be 10 percent less than diesel. Hydrogen was assumed to 10 percent more than diesel. All costs assume pre-COVID-19 conditions.

Table 16. Conceptual Costs for Bus Options in 2022 Dollars

Costs	Diesel	Electric	Hydrogen
Capital Cost	New or Used Buses?	$9,828,000	$10,011,000
New Buses	$4,473,000	$7,668,000	$5,751,000
Used Buses	$2,876,000	-	-
Infrastructure	-	$2,160,000	$4,260,000
O&M Cost	$2,506,000	$2,255,000	$2,757,000
Total Bus Costs	$5,382,000-$6,979,000	$12,083,000	$12,768,000
Note: Costs are rounded to the nearest $1,000.			

The most expensive buses are electric, at $1,278,000 million per bus [27] in 2022 dollars. The total capital costs include chargers (infrastructure) at Suisun Amtrak Station and at the BART Dublin/Pleasanton Station as well as at the service's maintenance facility. It is worth noting that Solano Transportation Authority has obtained state funding to put inductive charging at the BART Walnut Creek station by 2023.

Hydrogen buses are next most expensive at $959,000 per bus [28] in 2022 dollars. Hydrogen buses will require a fueling station (infrastructure) at the service's maintenance facility. Hydrogen fuel costs are comparable to diesel fuel costs. That is, one kilogram of hydrogen fuel, used in a fuel cell to power an electric motor, has an equivalent energy density to one gallon of diesel fuel. While hydrogen fuel costs approximately $8 per kilogram [29] and diesel fuel costs around $3.50 per gallon [30], hydrogen fuel cell electric motors have twice the fuel economy as compared to diesel combustion engines [31]. The net result is a similar fuel costs between the two modes. Additionally, as time goes on, the cost per vehicle for hydrogen fuel cell vehicles is expected to drop. According to a joint report published by Deloitte Touche Tohmatsu Limited (a major global accounting firm) and Ballard Power Systems (a leading fuel cell manufacturer), "The cost of fuel cell vehicles has been falling

[27] Per Lee Kemp, Motor Coach Industries, New Coach Sales: Public Sector, July 07, 2020; costs per bus rounded to nearest thousand
[28] Ibid.
[29] Per Lauren Skiver, CEO, Sunline Transit Agency, Riverside, California, October 27, 2020.
[30] U.S. Energy Information Administration, January 25, 2021.
[31] Rocky Mountain Institute, https://rmi.org/run-on-less-with-hydrogen-fuel-cells/

dramatically for years. And it will continue to drop within the next decade and beyond" [32], due in large part to increasing manufacturing efficiency.

Accordingly, though hydrogen buses – including the fueling station, O&M costs, and the buses themselves – are the most expensive option overall in 2022, the differential in comparison to electric buses will diminish over time.

Conventional diesel-powered commuter buses (the cost for which appears in the table above) are noticeably less expensive to purchase than electric and hydrogen buses at $746,000 [33] per bus; and will not require additional infrastructure. Used buses are even less expensive at $479,000 [34] per bus. There are many used buses readily available on the secondary market.

The costs over the time horizon of this study appear in **Table 17** in year of expenditure (YOE) dollars. The relatively low implementation capital costs in 2022 are a result of the used diesel bus assumption. The 2022 estimate includes the construction of a bus stop (infrastructure) at the Bollinger Canyon PNR serving Bishop Ranch. Capital costs rise dramatically in 2027, when the service reequips with nine hydrogen buses (the additional buses needed for the higher frequency schedule in that year). Thirteen years later, in 2040, the service will again reequip with 10 hydrogen buses (the additional buses needed for the higher frequency schedules in that year).

Table 17. Conceptual Costs for I-680 Express Bus Service in YOE Dollars

Costs	2022	2027	2040
Capital Cost	$3,354,000	$15,085,000	$16,898,000
Buses	$2,876,000	$10,098,000	$16,898,000
Infrastructure	$478,000	$4,987,000	$0
O&M Cost	$2,506,000	$3,730,000	$6,790,000

6.1.3 Governance

This section explores to governance models for the I-680 Express Bus service. First, a Joint Powers Authority (JPA) could be established, consisting of the transportation/transit agencies in the operational area, viz., Central Contra Costa Transit Authority, the Livermore Amador Valley Transit Authority, and the Solano Transportation Authority. An example of the JPA is the Capitol Corridor Joint Powers Authority, whose member agencies are:

- Placer County Transportation Planning Agency (PCTPA)
- Solano Transportation Authority (STA)
- Yolo County Transportation District (YCTD)
- Sacramento Regional Transit District (SacRT)
- San Francisco Bay Area Rapid Transit District (BART)
- Santa Clara Valley Transportation Authority (VTA)

Second, a joint operation involving the three agencies could be established, along the lines of SolanoExpress. SolanoExpress is a consortium of Vacaville City Coach, Solano County Transit (SolTrans), Rio Vista Delta Breeze, Fairfield and Suisun Transit and other transit agencies providing shared service to specific inter-agency jurisdiction routes. SolanoExpress, operated by STA, provides express intercity bus service throughout Solano County. Individual routes are operated by FAST and SolTrans.

At the November 10, 2020 meeting of the Technical Advisory Committee (TAC) guiding the development of this study, TAC members expressed greater interest in establishing a joint operation, possibly through the issuance of a memorandum of understanding, than in creating a new JPA.

[32] Ballard, January 2020 Press Release https://blog.ballard.com/fuel-cell-price-drop
[33] Per Lee Kemp, Motor Coach Industries, New Coach Sales: Public Sector, July 07, 2020
[34] Ibid.

6.1.4 Revenue, O&M Costs, and Subsidy

A summary of forecasted riders, conceptual O&M costs (per Table 16), estimated revenue (riders multiplied by an average fare of $5.75 in 2020 dollars escalated for future years), and resulting subsidies appears in **Table 18**. O&M costs assume diesel buses in 2022 and hydrogen buses in 2027 and 2040. The subsidy (O&M cost less fare revenue) is a modest $1.1 million at initiation of service. As service levels increase in 2027 and again in 2040, so do revenue and operating costs. Note that estimated ridership in start-up year is 75 percent of the 1,295 weekday forecasted in Technical Memorandum 2, reflecting operations at start-up when the service is just getting known by the riding public.

Table 18. Ridership, Cost and Subsidy Estimates for I-680 Express Buses in YOE Dollars

	2022	2027	2040
Weekday Riders	971	1,635	1,885
O&M Cost	$2,506,000	$3,730,000	$6,790,000
Revenue	$1,419,000	$2,743,000	$4,091,000
Subsidy	$1,087,000	$987,000	$2,699,000
Note: Ridership modeling was based on pre-COVID-19 ridership assumptions and actual utilization may be subject to a longer ramping up period if started in 2022.			

6.1.5 Funding Sources

Funding sources must be found for acquiring buses and covering the ongoing subsidy for the I-680 Express Bus service. Various sources can be explored. These include the following.

Senate Bill 1

Senate Bill 1 (or SB1), the Road Repair and Accountability Act of 2017, was signed into law on April 28, 2017 by Governor Jerry Brown. The legislation provides for $54 billion over the next 10 years for road, highway, and bridge repair and to improve and expand transit. SB1 funding could be a source for implementing the I-680 Express Bus service in 2022.

SB 1 provides public transit funding each year through various programs. According to the California Department of Transportation (Caltrans) [35], SB1 funding programs include the following.

- **State Transit Assistance (STA) Program: $250 million annually.** The money is aimed for transit agencies for funding their capital infrastructure and operational costs. Funding is distributed via current funding formulas based on agency revenue and population.
- **State of Good Repair Program (SGR): $105 million annually.** The money is for transit capital projects or services to maintain or repair existing transit fleets and facilities; new vehicles or facilities that improve existing transit services; or transit services that complement local efforts to repair and improve local transportation infrastructure. The funding is available to eligible transit operators based on the California State Transportation Authority (CalSTA) formula.
- **Transit and Intercity Rail Capital Program (TIRCP): $300 million annually.** The money is provided through competitive grants for transformative projects that modernize transit systems, increase ridership, reduce GHG emissions and improve safety. Funding can be use invested in local transit, particularly transit that is tied to the intercity rail network.

Sustainable Transportation Planning Grant Program

The Sustainable Transportation Planning Grant Program includes two programs which can help with detailed planning for the I-680 Express Bus implementation in 2022 [36]. These programs are as follows.

- **Sustainable Communities Grants ($29.5 million):** The funding is aimed at encouraging local and regional planning that furthers state goals, including, but not limited to, the goals and best practices cited in the Regional Transportation Plan Guidelines adopted by the California Transportation Commission.

[35] http://rebuildingca.ca.gov/transit.html
[36] https://dot.ca.gov/programs/transportation-planning/regional-planning/sustainable-transportation-planning-grants

- **Strategic Partnerships Grants ($4.5 million):** The funding is aimed at identifying and addressing statewide, interregional, or regional transportation deficiencies on the state highway system in partnership with Caltrans. A sub-category funds transit-focused planning projects that address multimodal transportation deficiencies.

Local Tax Initiative

A Bay Area-wide sales tax initiative could be a funding source for the ongoing operations of the I-680 Express Bus service. Such a tax has been proposed by a coalition of policy advocacy groups, including the Bay Area Council, the San Francisco Bay Area Planning and Urban Research Association, and the Silicon Valley Leadership Group. The coalition is known as FASTER Bay Area. If such a tax were implemented, funds would be dispersed to regional transit districts, including BART, the Metropolitan Transportation Commission, and others.

FASTER Bay Area could raise $100 billion for transit investment over the next 40 years for transformative projects that represent "good value for money," according the initiative's website [37]. FASTER Bay Area has yet to appear on the ballot for voter approval. The next opportunity will likely be in 2022. The California State Legislature would need to pass a bill authorizing FASTER's placement on ballots in all nine Bay Area counties.

6.2 Options for Implementation

While the conceptual service plan envisions Express Buses operating on weekday between the Suisun Amtrak Station and the BART Dublin/Pleasanton Station starting in 2022, there are alternative options that can be considered. One such option would be only to operate the service at start-up between Martinez and Dublin/Pleasanton BART Station, extending to the Pleasanton ACE Station during the commute period. The option would provide connections to *Capitol Corridor*, *San Joaquins*, and ACE trains, and save operating costs due to fewer vehicle miles traveled.

Another such option could be split service in outer years (2027 through 2040) where half of the buses have a northern terminus at Martinez and the other half at Suisun, skipping Martinez. These options are compared in **Table 19**. Option A represents the conceptual service plan in 2022, 2027, and 2040. Option B represents service alternative having a northern terminus at Martinez in 2022. Options C and D assume split service in 2027 and 2040, respectively.

Hydrogen buses are assumed for 2027, and a re-fleeting of hydrogen buses is assumed for 2040.

Table 19. Implementation Options for I-680 Service Compared in YOE Dollars

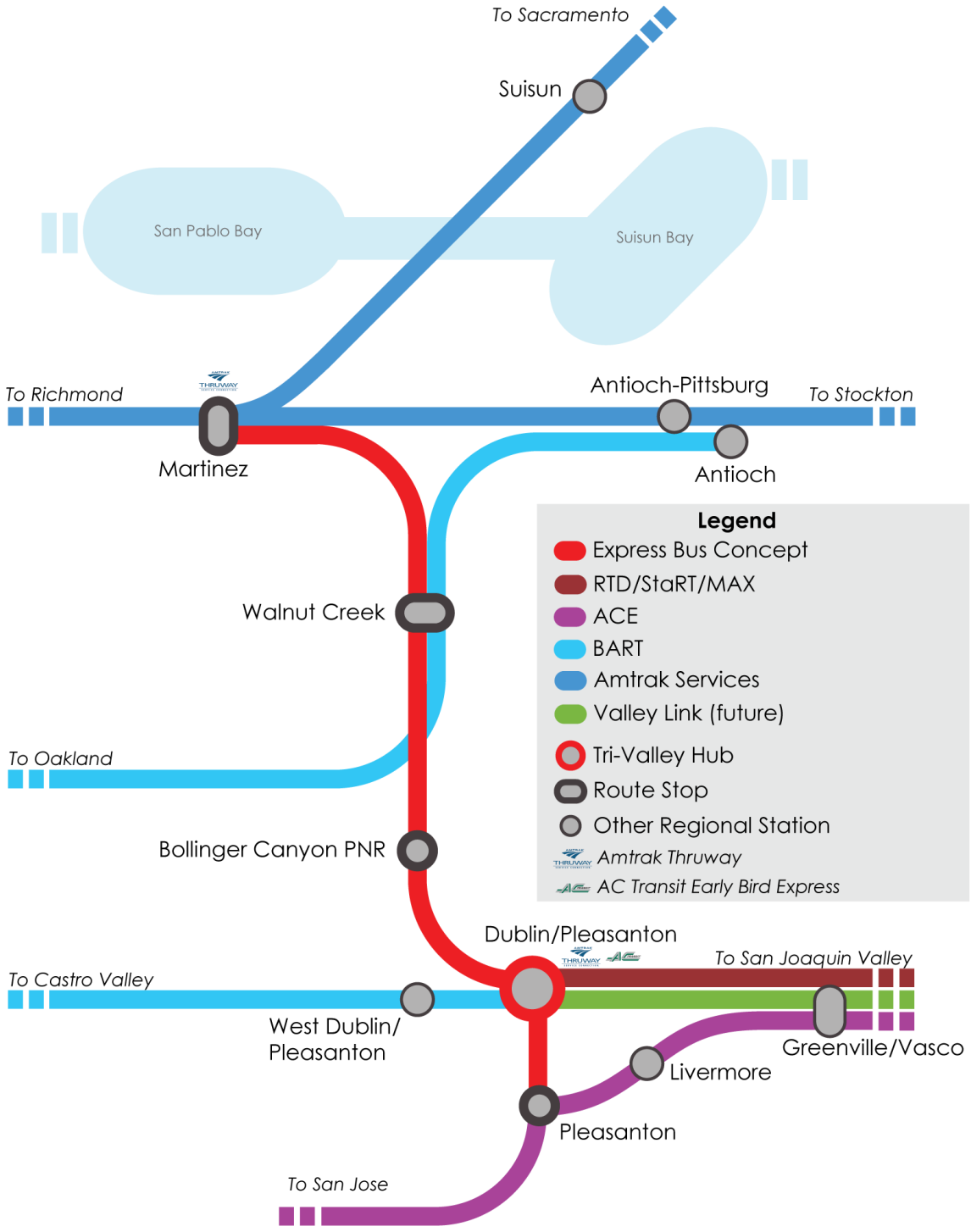
	2022		2027		2040	
	Option A 2022	Option B Martinez	Option A 2027	Option C Split	Option A 2040	Option D Split
Daily Riders	971	846	1,635	1,717	1,885	2,074
Daily Trips	34	34	42	42	50	50
Capital Cost	$3,354,000	$2,874,000	$15,085,000	$13,963,000	$16,898,000	$15,208,000
Buses	$2,876,000	$2,396,000	$10,098,000	$8,976,000	$16,898,000	$15,208,000
Infrastructure	$478,000	$478,000	$4,987,000	$4,987,000	$0	$0
O&M Costs	$2,506,000	$1,622,000	$3,730,000	$3,121,000	$6,790,000	$5,828,000
Revenue	$1,419,000	$1,236,000	$2,743,000	$2,880,000	$4,091,000	$4,500,000
Subsidy	$1,087,000	$386,000	$987,000	$241,000	$2,699,000	$1,328,000

6.2.1 Near-term 2022

In this start-up year, Option A, the conceptual service plan, has 971 weekday riders, start-up costs of $3.4 million, and an operating subsidy requirement of $1,087,000. On the other hand, Option B, which assumes a northern terminus at Martinez instead of Suisun, has about 10 percent fewer daily riders, lower capital costs (one less bus needed), and a much lower required subsidy of $386,000 (due to a shorter route and fewer vehicle miles). The route Option B would take is shown in **Figure 24** below. Capital costs in this year include $478,000 for construction of a bus stop at the Bollinger Canyon PNR serving Bishop Ranch.

[37] https://fasterbayarea.org/

Figure 24. Route Option B – Martinez Terminus



6.2.2 Mid-term 2027

In this year, Option A, the conceptual service plan, has 1,635 weekday riders, $12.7 million in capital costs (new hydrogen buses and a fueling station), and an operating subsidy of $1 million. On the other hand, Option C, which assumes half of the buses terminate at Suisun (skipping Martinez) and the other half at Martinez, has about five percent more riders (due to faster transit times between the Walnut Creek BART Station and Suisun), less capital cost (one less bus), and one-quarter the required subsidy (due to fewer overall vehicle miles).

6.2.3 Long-Term 2040

In this year, Option A, the conceptual service plan, has 1,885 weekday riders, $13 million in capital costs (new fleet of hydrogen buses), and an operating subsidy of $2.7 million. On the other hand, Option D, which assumes half of the buses terminate at Suisun (skipping Martinez) and the other half at Martinez, has about 10 percent more riders (due to faster transit times between the BART Walnut Creek station and Suisun), less capital cost (one less bus), and one-half of the required subsidy (due to fewer overall vehicle miles).

In addition to the above, SolanoExpress and County Connection are proposing modifying existing bus routes and having a coordinated transfer point at the Walnut Creek BART Station. Specifically, SolanoExpress is envisioning extending its Blue Line service between Sacramento Valley Station and the Pleasant Hill/Contra Costa Centre BART Station to the Walnut Creek BART Station. The Pleasant Hill/Contra Costa Centre BART Station will no longer be a Blue Line stop. The service change is planned for the summer of 2021.

This extension will greatly enhance service through inter-agency coordination and will improve service to Bishop Ranch, the largest single-point employer in the northern half of the I-680 corridor. Coordination between the agencies can provide an immediate opportunity for a seamless transfer at Walnut Creek. Connection protection and coordination of schedules are currently being researched by both agencies. The SolanoExpress Yellow Line service already links the Walnut Creek BART Station with the Vallejo Transit Center. In the near future the Yellow Line also will not stop at Pleasant Hill/Contra Costa Centre BART.

Moving ahead, SolanoExpress, County Connection, and Wheels will continue working together to enhance mobility in the I-680 corridor. This enhanced coordination will also compliment the new Express Bus service envisioned for the corridor. The route map for future Blue Line service and Yellow Line service can be seen in **Figure 25**.

Figure 25. Future SolanoExpress Blue Line Service and Yellow Line Service

Source: Solano Transportation Authority

6.3 Next Steps for I-680 Express Bus Service Implementation

In 2022, Option B with a northern terminus at the Martinez Amtrak Station will cost $480,000 less to implement that Option A with a northern terminus at the Suisun Amtrak station. Furthermore, Option B has a required subsidy $701,000 less than Option B, while carrying 90 percent of Option A's forecasted ridership in that year. Accordingly, it appears to be the more appropriate option for start-up of Express Bus service. A schedule for Option B appears as **Appendix F**.

In the future, however, the Sonoma-Marin Rail Transit service may extend east of its north-south Larkspur-Novato-Petaluma-Santa Rosa route across the North Bay and through American Canyon to the Suisun Amtrak Station in order to connect with the *Capitol Corridor* service. SMART's feasibility study of the service extension assumes two options for implementation between the Novato-Hamilton SMART station and the Suisun Amtrak station. Option 1 would employ used conventional locomotive-hauled, push-pull trainsets and four round trips per day, with a capacity to carry 2,100 passengers daily. Option 2 would use diesel multiple unit (DMU) self-propelled rail cars, making 10 round trips per day, with a capacity to carry 5,400 passengers daily. At Novato, riders would have a cross-platform transfer to north-south SMART trains. A SMART platform would be required at Suisun for those transferring to and from *Capitol Corridor* trains. While Option 2 assumes DMUs, like those which SMART uses today, other technologies such as hydrogen-powered and even battery-powered electrical multiple units (EMUs) may be available. While the study does not identify a specific date, it notes that implementation could occur six years after funding for the new service becomes available [38].

If and when SMART comes to Suisun, the extension of I-680 Express Bus service to Suisun may make sense. Options C and D, with service split between a Martinez and Suisun in 2022 and 2040, would provide many opportunities for transfers between the new SMART trains and the I-680 Express buses at Suisun, offering a two-seat ride between Novato and the Tri-Valley Hub.

More immediately, however, next steps for the Express Bus service include securing a funding source for implementation and covering ongoing subsidies, as revenues will be less than operating costs. Also, the service needs a governance structure,

[38] Passenger Rail Service Novato to Suisun City, SMART, May 2019, https://sonomamarintrain.org/sites/default/files/Board/COC%20Documents/SMART%20-%20Passenger%20Rail%20Service%20Novato%20to%20Suisun%20City%20-%20Report.pdf

which could include the three service providers on the corridor today: Livermore Amador Valley Transit Authority (Wheels), Central Contra Costa Transit Agency (County Connection), and the Solano Transportation Authority (SolanoExpress).

Chapter 7 - Potential Improvements at Tri-Valley Hub

This chapter discusses physical and operational improvements enhancing the ability of the Dublin/Pleasanton BART Station to handle more demand with improvements facilitating more buses, active transit, and pedestrians. With the advent of Valley Link regional rail connecting with BART at the Dublin/Pleasanton Station, there logically will be more transfers to and from transit at the station than there is today. While most Valley Link riders will be bound for BART destinations, some will seek to transfer to local transit for furtherance to Tri-Valley work centers, shopping, and other venues. Also, continued growth in population and jobs in the Tri-Valley will likely generate more Dublin/Pleasanton Station users who will come to the station by various means: local transit, bike, scooter, or on foot.

In sum, the station will become more than BART's Blue Line terminus. The station will perform the role of a transit hub, where various modes and operators connect. Indeed, this study identifies the station as the Tri-Valley Hub, called for in the 2018 *California State Rail Plan*. The improvements described below are aimed at making this hub more capable of handling the increasing demand in ways that are useful for BART, Valley Link, and connecting transit riders and area residents.

This following narrative first summarizes the planned developments surrounding the Dublin/Pleasanton BART Station as well as the start-up of Valley Link. Next, the existing bus transit parking facilities, wayfinding, and bicycle storage facilities at the station are noted. Subsequently, the narrative it posits several ideas for improvements in bus handling capacity, circulation, wayfinding, and active transit facilities that could be considered as a demand for must buses and improved multimodal access increases. Improvements are envisioned for both the north or Dublin side of the station and the south or Pleasanton side of the station. The two sides are connected by the "tunnel", i.e., the I-680 and BART overcrossing of Iron Horse Trail.

It is important to emphasize that additional work and coordination among BART, other transit service providers at the station, and the local jurisdictions (the cities of Dublin and Pleasanton) need to occur before any of the identified concepts advance to further development or implementation.

7.1 Planned Development Surrounding the BART Dublin/Pleasanton Station

7.1.1 Catalysts for Development

As previously noted, the purpose of this chapter is to identify improvements to transit, bike, and pedestrian access to the Dublin/Pleasanton BART Station as utilization of the facility increases. Two catalysts for such an increase would be (1) the implementation of Valley Link rail service terminating at the station in 2028 and (2) the growth in population and employment in the Tri-Valley area and, more specifically, in the areas surrounding the Dublin/Pleasanton BART Station.

While the vast majority of Valley Link riders will seek transfer to BART trains, it is logical to assume that there will be transfers to local transit at the station as riders seek to access local employment and other activity centers. The service will offer high-frequency rail service between northern San Joaquin County communities and the BART Dublin/Pleasanton terminus. Frequencies will increase over time, and the service may be extended to Stockton. The service will provide an alternative to driving on chronically congested I-680 over Altamont Pass. Start-up for the service could occur as soon as 2028, according to the Tri-Valley San Joaquin Valley Regional Rail Authority, sponsor of Valley Link.

A map of the Valley Link route appears as **Figure 26**.

Figure 26. Planned Valley Link Service

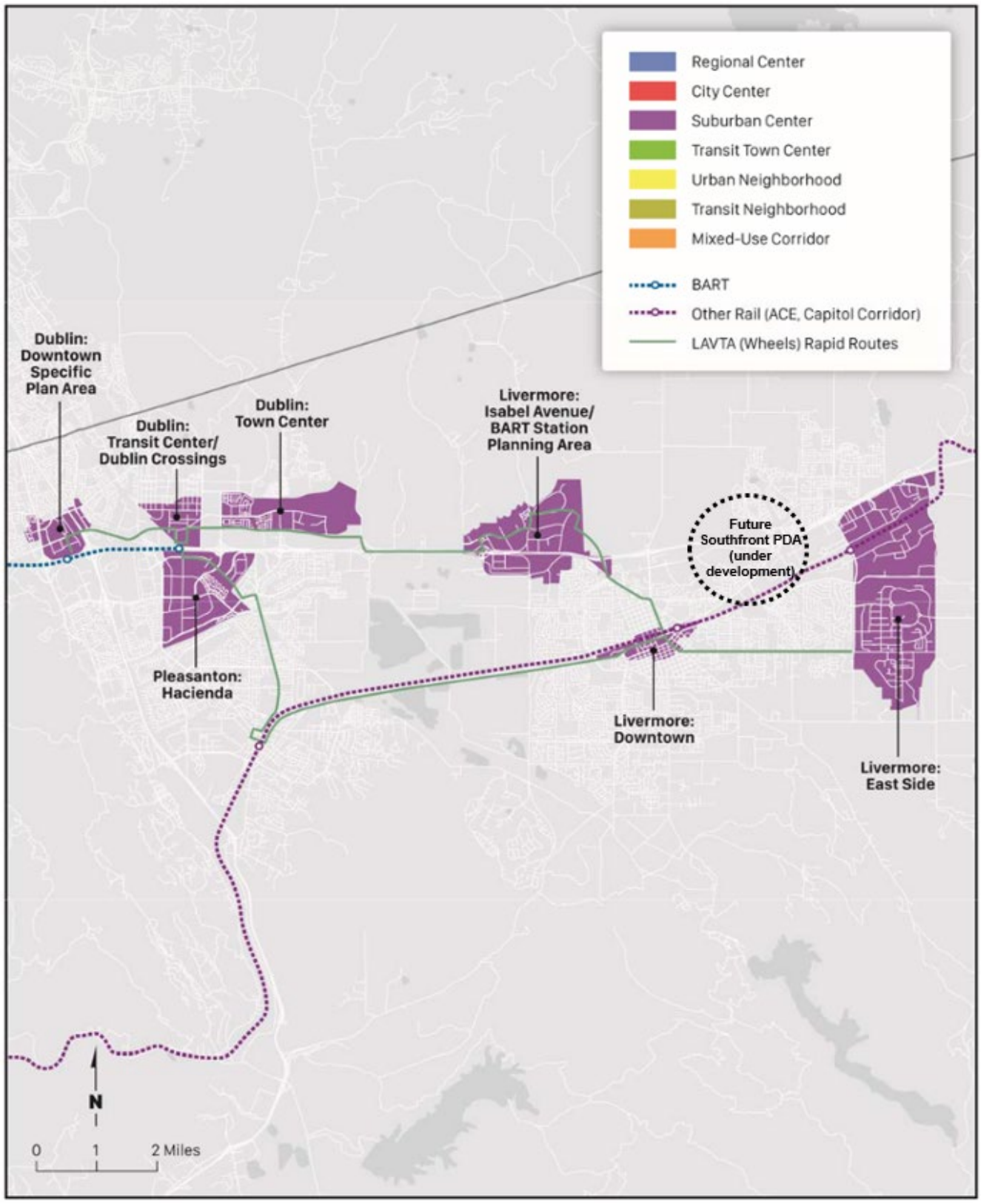
Source: https://www.valleylinkrail.com/

As noted in Chapter 1, the summary of existing and future conditions, both jobs and population in the Tri-Valley are forecasted to grow dramatically between 2020 and 2040, as seen in Table 4. On a percentage basis, jobs will grow faster than the population.

7.1.2 Developments near the Tri-Valley Hub

Figure 27 shows the various mixed-use developments planned for the Tri-Valley area, including two that are adjacent to the Dublin/Pleasanton Station: Dublin Crossings and Pleasanton BART Transit Village at the BART Dublin/Pleasanton Station and the Hacienda Business Park. The Southfront Priority Development Area (PDA) development is also noted.

Figure 27. Developments Planned for the Tri-Valley Area



Source: https://www.alamedactc.org/wp-content/uploads/2018/11/2017_AlamedaCounty_PDA_IGS.pdf
Note: Figure modified by AECOM to indicate Southfront PDA.

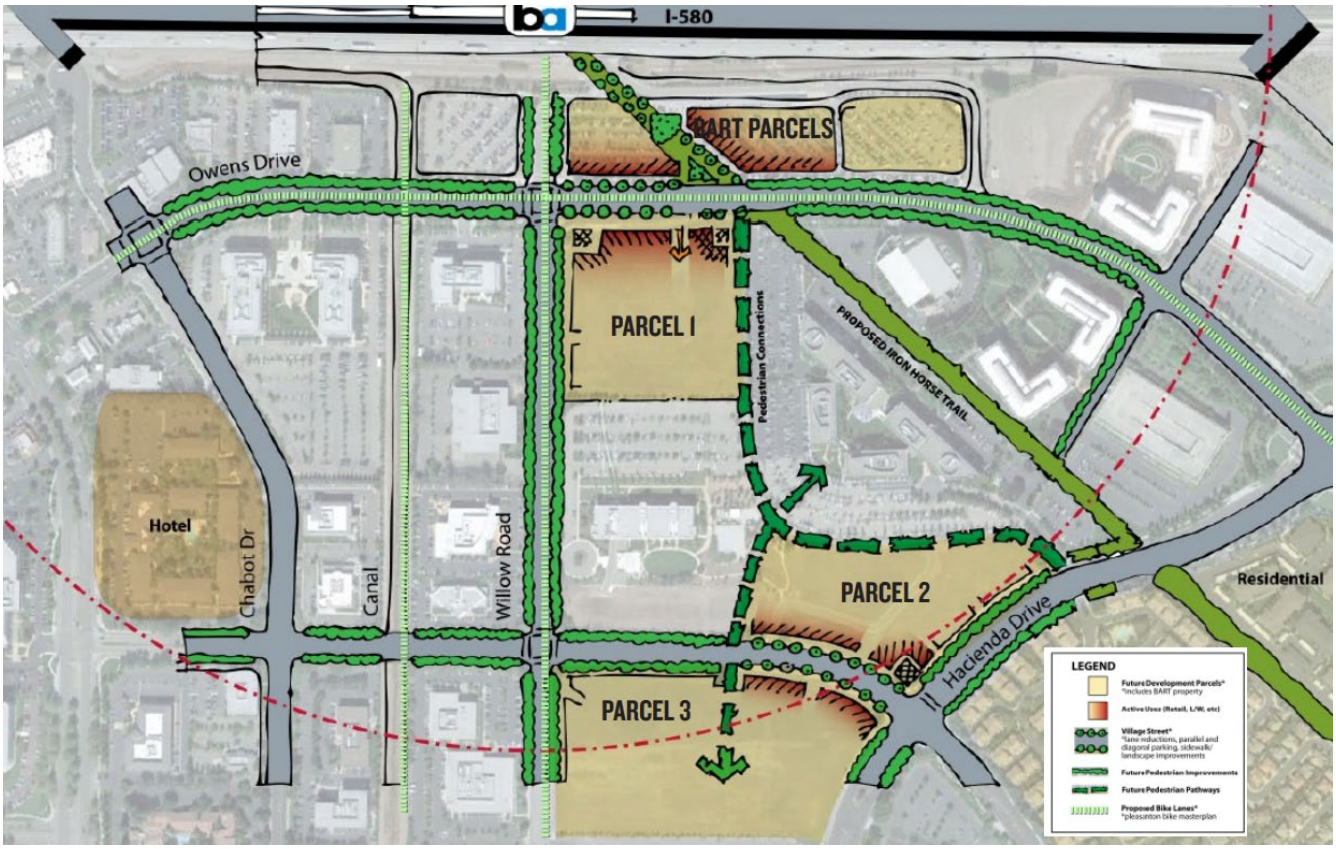
The *Dublin Crossings Specific Plan* envisions up to 1,995 residential units, up to 200,000 square feet of commercial uses, a 30 net-acre community park, neighborhood park land, and a school site. A concept of the Dublin Crossings developed appears in **Figure 28**.

Figure 28. Dublin Crossings Development

Source: https://dublin.ca.gov/DocumentCenter/View/14502/Dublin-Crossing-SP-2017?bidId=

The Pleasanton BART Transit Village creates overlay zones for three parcels in the Hacienda Business Park and BART Dublin/Pleasanton station property to allow for the incremental development of a transit-oriented development (TOD) village around the station. A concept drawing of the Pleasanton BART Transit Village appears in **Figure 28**.

Figure 29. Dublin/Pleasanton BART Transit Oriented Development



Source: https://www.vmwp.com/wpress/wp-content/uploads/1026-PLEASANTON_TOD.pdf

7.1.3 Transit Improvements Likely to Be Needed

Given the start-up of Valley Link and consequent transfers to local transit in addition to BART, the general growth in jobs and population in the Tri-Valley area, and planned TOD communities adjacent to BART's Dublin/Pleasanton Station, it reasonable to conclude that the demand for transit services at the station will increase, and that the role of that station will shift from a BART terminus to a true transit hub – that is, to a Tri-Valley Hub. The sections that follow envision as-needed improvements at the station to help with its transition to a Tri-Valley Hub. These include improvements to transit access, circulation, and active transit facilities (bikes and micro-transit). Some or all may be needed, or perhaps none at all, if existing capacity proves sufficient to handle the demand.

In all likelihood, however, capacity improvements will be needed to some extent, as too much is happening around the station for demand not to grow. Furthermore, attention should be paid to how well the improvement would work. That is to say, improvements should be designed and implemented with the transit user in mind. They should be attractive and convenient so as to encourage their use. While design considerations themselves are beyond the scope of the current effort, attention to design is important consideration for a successful implementation.

7.2 Existing Facilities and Planned Improvements

7.2.1 Existing Facilities

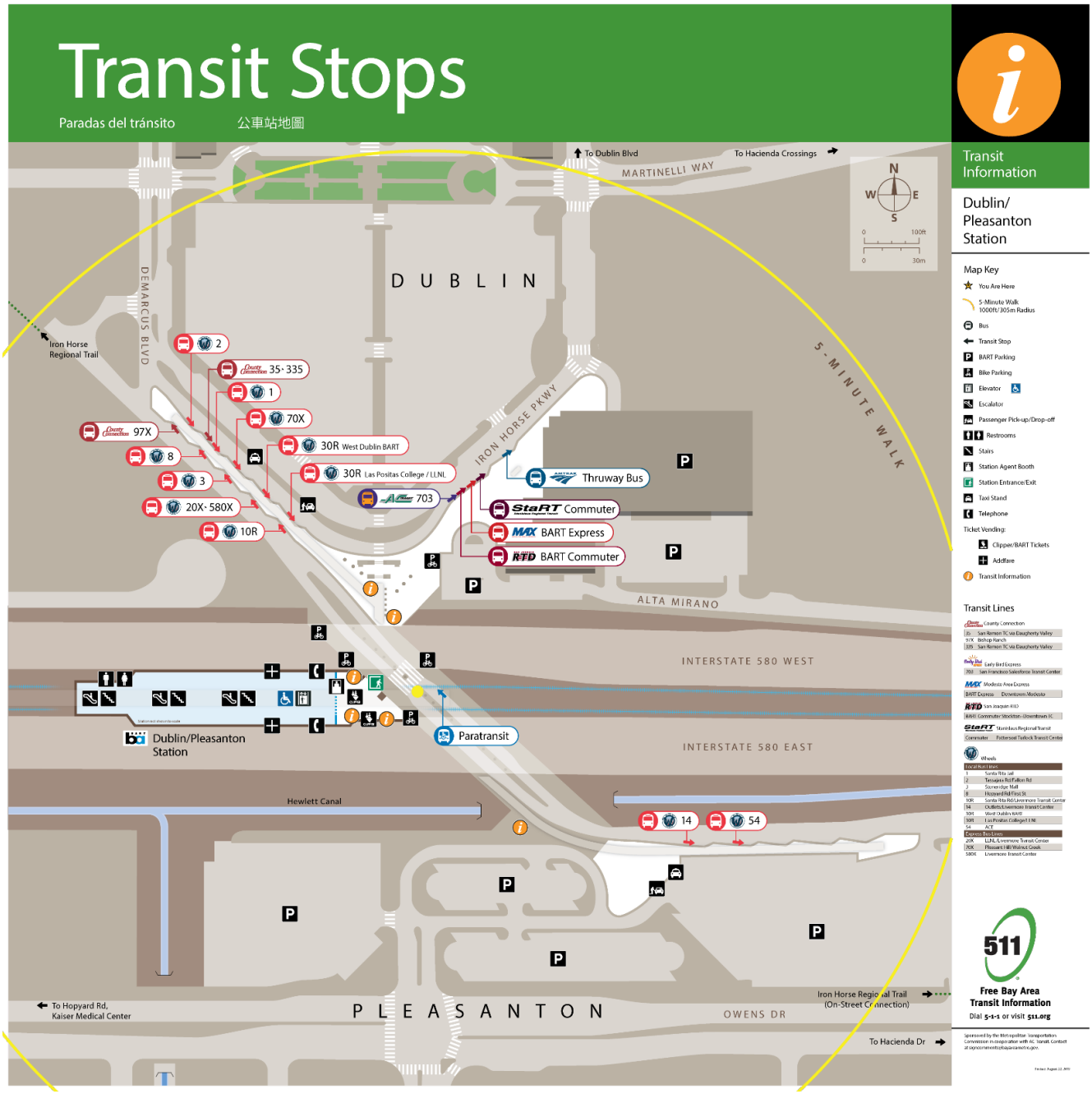
Listed below is a summary of the existing bus bays, wayfinding, and bike parking at the Dublin Pleasanton BART Station.

Bus Bays

The map appearing as **Figure 30** is from the 511 Free Bay Area Transit Information site and identifies the bus bays utilized by County Connection (operated by the Central Contra Costa Transit Authority), Wheels (operated by Livermore Amador Valley Transit Authority), Amtrak Thruway, and StaRT Commuter (operated by Stanislaus Regional Transit), MAX BART

Express (operated by Modesto Area Express), RTD BART Commuter (operated by San Joaquin Regional Transit District), and AC Transit. Bus bays serve external circulation: they provide a means for bringing people to and from the station by bus.

Figure 30. Existing Bus Transit Facilities at Dublin Pleasanton Station



Source: 511 SF Bay Area
Note: Figure modified to show SAV parking zone and slightly larger 5-minute walking radius.

There are 10 bus bays on bus island located in the northwestern quadrant of the Dublin side of the station north of I-580 freeway. These are utilized by County Connection and Wheels. A visit to the facility showed that spaces for Wheels Routes 1 and 2 have flipped positions since this map was developed.

There are two bus bays just to the east along Iron Horse Parkway, just west of the BART parking structure. These are utilized by Amtrak Thruway, StaRT, MAX BART Express, and RTD BART Commuter (RTD Route 150), and AC Transit.

Lastly, there are five bays along a bus island on the Pleasanton side of the station south I-580. Two of these are used by Wheels buses daily. A third bus bay is used about one month a year by Wheels Route 52, which operates between the station and the Alameda County Fairgrounds during the County Fair in June and July.

Wheels Routes 14, 52 (the seasonal bus not shown above), and 54 utilize the Pleasanton side bus bays. All other routes from other directions use bus bays on the Dublin side.

Wayfinding

As seen in Figure 28, there are five information signs and kiosks or signs at the station:

- Three wall mounted signs inside the interior of the BART station.
- Two kiosks in the plaza just outside the I-580/BART overcrossing on the Dublin side.
- One kiosk in the plaza just outside the I-580/BART overcrossing on the Pleasanton side.

These signs and kiosks display the location of bus bays and other station amenities to orient the rider, as well as point reader to either the Dublin or Pleasanton side of the station. They also display BART and connecting transit bus route information, as seen in **Figure 31.**

Figure 31. Information Kiosk outside the BART Station Entrance

Bike Storage

Bike storage exists at the entrance to the BART station, as seen in **Figure 32**. There are 68 on-demand BikeLink lockers and 24 keyed lockers located at the station. Bike racks are also available. Such facilities exist on both sides of Iron Horse Trail in the tunnel. Bike lockers and racks are available on a first come, first served basis. As of 2019, utilization of these bike facilities averaged 92 percent full. This data is based on BART's annual utilization survey.

Figure 32. Bicycle Lockers outside of BART Station Entrance

Parking and Drop-off

Paid parking is available in several surface parking lots on the Dublin and Pleasanton sides of the station. There is also a large parking structure on the Dublin side. There is a total of 2,886 spaces available, and all parking is paid parking.

ADA parking is also available on both sides of the station. On the Dublin-side the ADA parking is on the east side of the transit plaza at the north end of the tunnel. On the Pleasanton side, the parking is along the south side of the bus bay island.

Taxi parking and parking for Transportation Network Companies (TNC) like Uber and Lyft are available on both sides of the station. These facilities are located adjacent to pick-up and drop off areas. Employer shuttles use these facilities as well.

7.2.2 Planned Improvements

Dublin/Pleasanton Bicycle and Pedestrian Access Improvements

According to BART [39], this project is to improve bicycle and pedestrian access to the Dublin/Pleasanton BART Station, with the following goals:

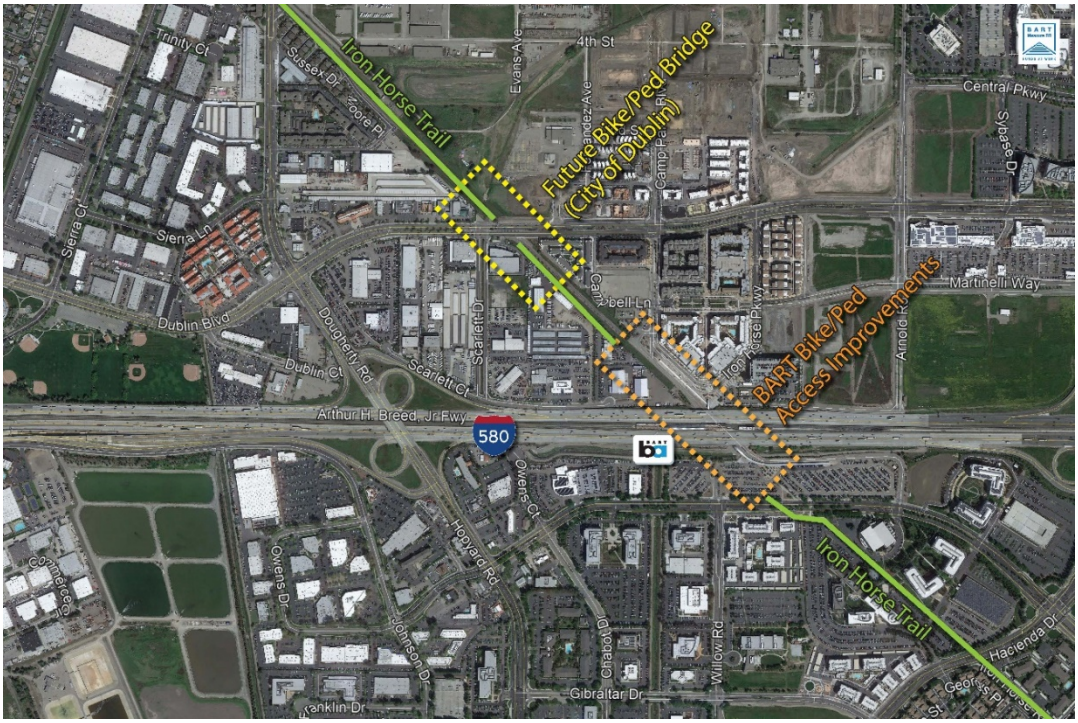
- Close the gap in the Iron Horse Trail so that BART riders can use it for recreation and access the broader network of trails and green spaces in the area.
- Advance the 2016 BART Station Access Policy goals (safer, healthier, greener) and targets (52 percent active access by 2025).
- Separate pedestrian and bicyclist traffic to improve safety and comfort.

[39] https://www.bart.gov/about/planning/station-access/dublin-pleasanton-bike

In parallel to BART's project, the city of Dublin is advancing design for a bicycle and pedestrian bridge over Dublin Boulevard and other improvements to the trail segment immediately north of the BART station area which will close another significant gap in the trails network. The project area is shown in **Figure 33.**

The project aims to support recreational trips on the trail, including for users who take BART to the trail and for existing users who bike and walk on the trail to BART. The project also aims to make walking and biking to and from BART a better, more attractive option for more people who can and want to walk and bike.

Figure 33. Planned Dublin/Pleasanton Bicycle and Pedestrian Access Improvements



Source: BART

New Parking Garage

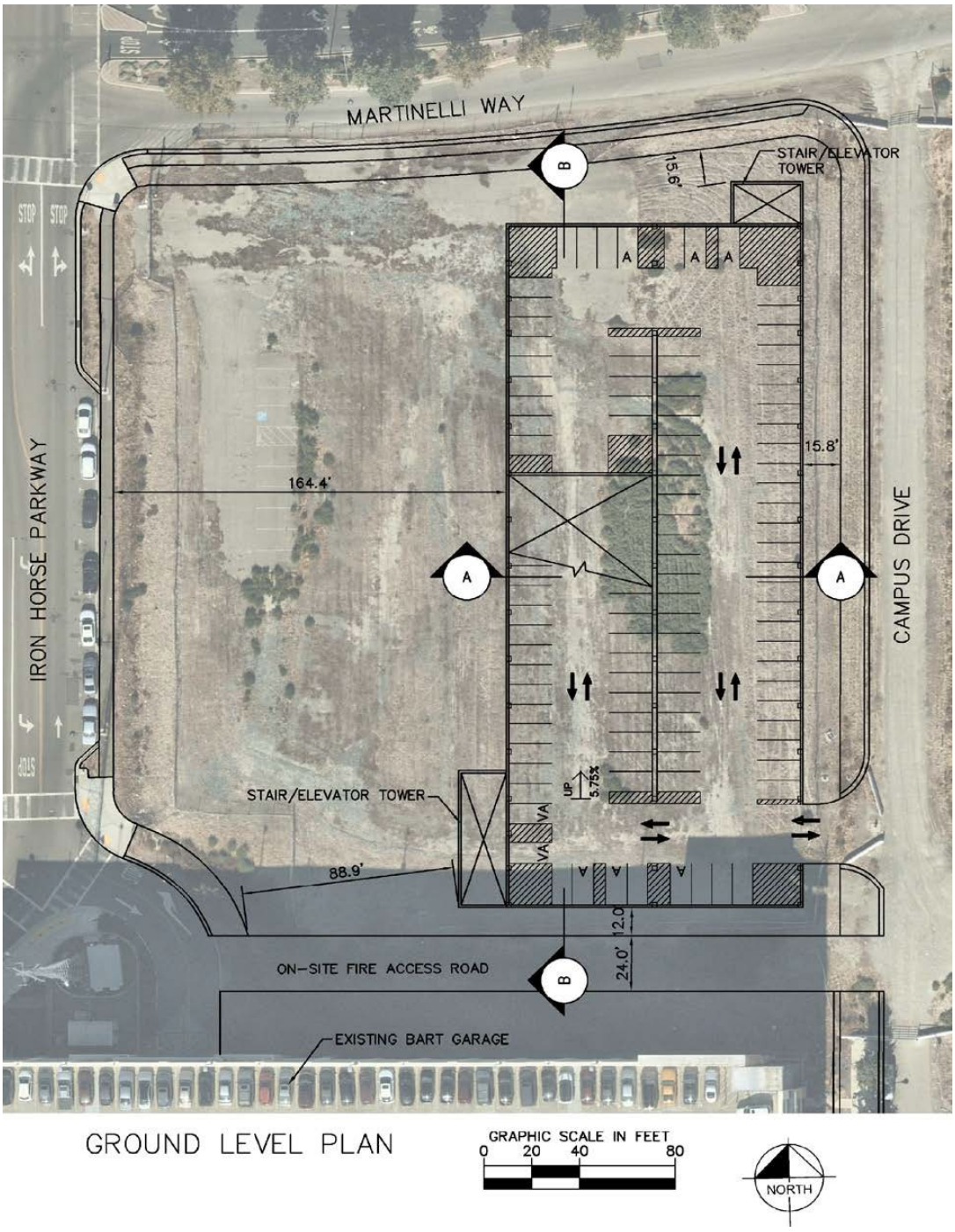
The County of Alameda General Services Agency (GSA) and the Livermore Amador Valley Transit Authority intend to build a new parking structure on an undeveloped County-owned property adjacent to the Dublin/Pleasanton station. The proposed Dublin Transit Center Parking Garage Project will have a capacity for over 500 parking spaces for Tri-Valley area commuters, including priority vanpool parking and Electric Vehicle (EV) charging stations, to promote and increase BART ridership and to advance the Dublin/Pleasanton BART Capacity Improvement and Congestion Reduction Program. It will also have six berths for LAVTA buses. The garage will provide approximately 28 secured bicycle parking or storage spaces. Furthermore, motorists can exit I-580 and park at the new garage to ride the I-680 Express Bus service, the other focus of the current project.

Funding for the garage is coming from the California State Transportation Authority's Transit and Intercity Rail Capital Program (TIRCP).

The garage will be located north of the existing BART parking structure on half a parcel between Iron Horse Parkway and Campus Drive, south of Martinelli Way, as seen in **Figure 34.** The parking lot will be a state-of-the-art convertible structure. If parking were no longer needed in the future as technology advances, the structure can be turned into additional housing or office space [40].

[40] https://www.independentnews.com/news/parking-garage-will-be-built-at-dublin-bart/article_db65549a-4e51-11e8-9ae0-03754b3ce094.html?utm_medium=social&utm_source=email&utm_campaign=user-share

Figure 34. Site Plan for the Dublin Transit Center Parking Garage



Source: County of Alameda

7.3 Potential Improvements

This section and those that follow discuss potential improvements to the Dublin Pleasanton BART Station aimed at enabling the facility to handle more bus-to-rail transfers as well as pedestrians and bikes. Most of the improvements will be within the station area footprint itself. Accordingly, all such improvements will need to comply with BART's Multimodal Access Design Guidelines, published by BART in August 2017 [41].

[41] https://www.bart.gov/sites/default/files/docs/BART%20MADG_FINAL_08-31.pdf

BART's Design Vision per its Station Experience Design Guidelines webpage is as follows: "BART stations will provide an excellent customer experience through high quality, unified design that reflects a world-class transportation system. Station design will enable regular, infrequent, and new BART customers of all backgrounds and abilities to easily access and navigate through the BART system and connecting mobility services to reach their destination. Consistent and high-quality design at stations shall contribute to a strong systemwide identity—increasing ridership, customer satisfaction, and BART's brand value—while optimizing system safety, operational efficiency, and revenue generation." [42]

7.3.1 More Bus Bays

Regarding bus bays, the priority should be to fully utilize existing facilities. There are three bus bays which serve no particular routes during most of the year. These are all on the Pleasanton-side bus island. New routes should be directed there first, as they are implemented. Alternatively, the assignments of buses could be reshuffled depending on destinations and runtimes. But if existing capacity there is consumed up over time, there are at least five alternatives for new bus bays can be considered. The concept would be scalable, that is, the bus bays could be implemented incrementally as conditions warrant and allow. These solutions are presented visually in **Figure 35** and discussed below.

Alternative A

This solution envisions at least two bus bays along the Iron Horse Parkway and just south of Martinelli Avenue. The bays would be just west of the proposed site for new low-income housing units.

Alternative B

This solution would convert a small paid parking area in the northwest quadrant of the station area into bus bays and a layover area with a bathroom facility for driver. This solution, however, would be dependent on the development of the planned Dublin/Pleasanton Bicycle and Pedestrian Access Improvements. Such development would preclude new bus facilities at this location.

Alternative C

This solution would convert existing employee and ADA parking northwest of the BART station entrance. This solution would require replacing these parking spaces, perhaps at the planned Dublin Transit Center Parking Garage. It would also require a new driveway to exit the new bus facility onto northbound Iron Horse Parkway.

Alternative D

This solution would provide an additional bus island with at least two bus bays east of the existing Pleasanton-side bus island. The new island and bus bays would be constructed in such a way as to prevent any displacement to existing parking at this location.

Alternative E

On the other hand, the south side of the existing bus island, seen in **Figure 36** below, can be converted into bus bays. With the conversion, the existing ADA parking spaces will need to be relocated, possibly to the Pleasanton-side BART surface parking lot west of Iron Horse Parkway closest as possible to the tunnel and in the area of the existing TNC, Taxi, and Kiss-and-Ride Passenger Zone. Buses using bus bays on the south side of the existing bus island would enter the BART station from the south, off Owens Drive, and would also leave the station via Owens Drive.

Potential Implementation

Any of the bus bay concepts noted above would appropriately be considered for implementation once the existing bus bay capacity is utilized. As noted, at least two bus bays on the Pleasanton side are unoccupied. Presumably the first improvement would be new spaces along northbound Iron Horse Parkway, as no major reconstruction would be required.

[42] https://www.bart.gov/about/planning/station_experience_design_guidelines

Figure 35. Alternative Bus Bays

Figure 36. South side of the Pleasanton-side Bus Island and ADA Parking

7.3.2 AV Shuttles and Routes

LAVTA today is testing Autonomous Vehicle (AV) shuttles on a reverse L-shade loop route between the ADA and employee parking lot, just to the north and east of the BART station entrance, and Martinelli Avenue and Arnold Road. It can carry about six sitting and six standing passengers. At the present time, testing requires a safety attendant aboard the vehicle to ensure safety and monitor the AV shuttle's progress. AVs could be deployed for either internal station circulation or to link the station with activity centers (dense housing areas, workplaces, and retail outlets). The AV vehicle appears in **Figure 37**.

Figure 37. South side of the Pleasanton-side Bus Island and ADA Parking

Source: Mass Transit Mag [43]

Shuttles for Internal Circulation

Two concepts to deploy these AV shuttles in regular service at the Dublin/Pleasanton BART station were developed. One is to provide for motorized circulation within the facility, as seen in **Figure 38**. The AV shuttles could connect all the proposed locations for new commuter and transit bus bays along with the planned Dublin Transit Center Parking Garage. Accordingly, riders parking at the garage could board an AV shuttle for a ride to the entrances to BART and Valley Link. Such a conveyance would be important in the case of ADA parking being relocated to the Dublin Transit Center Parking Garage from the Dublin-side employee parking area.

[43] https://www.masstransitmag.com/alt-mobility/autonomous-vehicles/press-release/21146238/transdev-north-america-transdev-partners-with-lavta-to-begin-testing-of-its-shared-avs

Figure 38. AV Shuttle Circulation Concept in the Dublin/Pleasanton Station

Shuttles Linking Station with Nearby Development

Alternatively, the AV shuttle could be deployed on its existing route to provide access between the Dublin/Pleasanton Station and shops, stores, and work centers just outside of the station area. For example, an Ikea store is planned for the parcel between Martinelli Way and I-680 and between Arnold Road and Hacienda Drive. Furthermore, there are numerous shops in the Persimmon Place commercial development north of Martinelli Way and between Arnold Road and Hacienda Drive. Business complexes are also planned further to the north. All these stores, shops, and office space could be linked to the Dublin/Pleasanton Station with an AV Shuttle operating to and from the station, as seen in **Figure 39**.

Potential Implementation

The widespread adoption of AV technology may not be far off. Still, the AV concepts noted above are not fully realizable in the near-term. Practically speaking, AV shuttles for internal station circulation could be considered once the Dublin Transit Center Parking garage is up and running. Likewise, the AV shuttles linking the station with nearby development could be considered once those developments are in place.

Figure 39. Future AV Shuttle Loop to Persimmon Place Shopping Center

7.3.3 Improved Wayfinding, Active Transit and Other Facilities

Noted below are various improvements that could benefit both existing and future station users. Accordingly, they could be implemented at any time – provided that they are supported by BART, other transit service providers, and the cities of Dublin and Pleasanton; and that funding is available.

Electronic Wayfinding

As noted previously, there are information kiosks at various locations at the Dublin/Pleasanton Station directing BART riders to connecting transit. These are static displays. The transit information is printed as a paper poster, and the poster is inserted into the kiosk and then overlaid with a plastic cover. The posters are changed manually as the transit information changes.

An alternative to static displays would be electronic signs, which can post the latest information on bus locations, departure times, estimated times of arrival, and other helpful information for riders in real time. Electronic signs, such as appears in

Figure 40, can also display BART train arrival and departure information. While no manual changing of information posters is required, these signs require ongoing maintenance. As compared to static informational displays, they are expensive to install, requiring underground wiring for power.

Figure 40. Electronic Information Display at the BART Berkeley Station Entrance.

Source: BART [44]

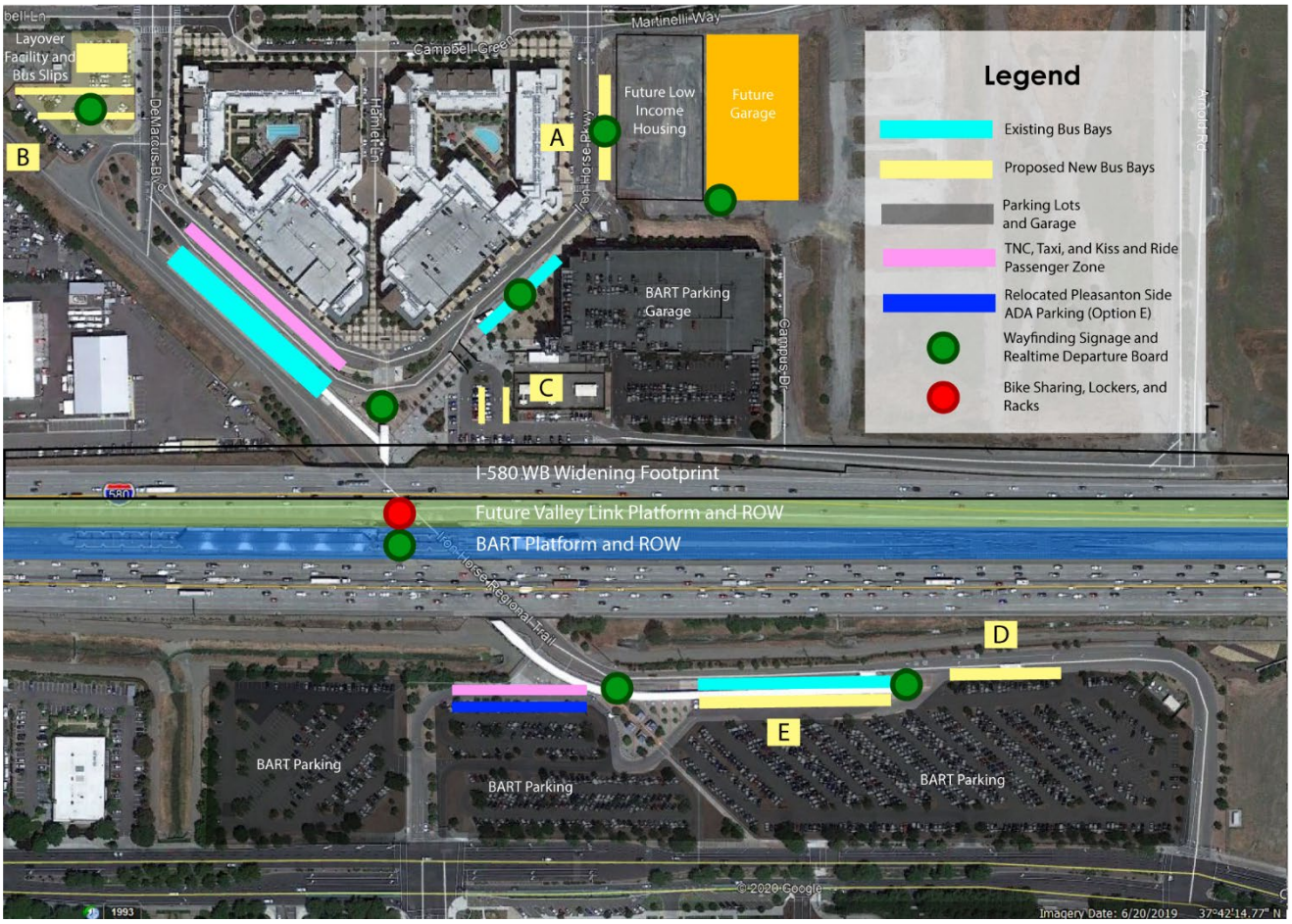
These electronic signs can be placed at locations most convenient for riders. As seen in **Figure 41**, such spots, represented by green dots, would include where kiosks exist today, plus at several more remote locations. These spots include at the planned Dublin Transit Center Parking Garage, new bus bays along Iron Horse Parkway just south of Martinelli Way, existing bus bays along Iron Horse Parkway just west of the BART Parking Garage, in the plaza near the Dublin-side bus bays, at new bus bays at the existing paid parking facility in the northwest quadrant of the station area adjacent to Iron Horse Trail, at the entrance to the BART station, and two on the Pleasanton-side along or near the existing and proposed bus islands.

The design and placement of electronic wayfinding displays should be consistent with principles articulated in *Regional Transit Wayfinding Guidelines and Standards*, published by the Metropolitan Transportation Commission in August 2019 [45].

Such signs could be implemented today at the BART entrance and at the transit plazas north and south of the tunnel entrance. Other signs would need to wait until new bus bays and the future Dublin-side garage are implemented.

[44] https://www.bart.gov/stations/dbrk
[45] https://mtc.ca.gov/sites/default/files/MTC_WayfindingGuidelines_2019.pdf

Figure 41. Potential Electronic Information Display Locations and Bike/Scooter Storage Location at Dublin/Pleasanton Station.



Improved Bike and Scooter Parking

As previously noted, bike racks and lockers are found at the entrance to the BART station on both sides of the tunnel and are represented by a red dot in the figure above. As use of the station increases, so will use of these facilities increase. They can be expanded to include a pick-up and drop-off area for electric scooters as well. As these improvements are not dependent on other physical improvements, they can be added as soon as the capacity for existing facilities is fully utilized.

Other Pedestrian and Bike Improvements

Planned pedestrian and bike improvements are noted above. It is important to note that access and egress for pedestrians is supported by several clearly marked facilities on either side of the station. These include Iron Horse Trail. There are also sideways both sides of Iron Horse Parkway and DeMarcus Boulevard. Parts of these walkways have fixed overhead covers which provide pedestrians with shade in the summer and rain protection in the winter.

One improvement to these facilities could be a fixed cover above the sidewalk between the BART tunnel entrance on the Dublin side and both the existing BART garage and the planned Dublin Transit Center Parking Garage. The cover would be of the same type that exists on the Pleasanton side of the station, seen in **Figure 42**.

The improvement would serve pedestrians going between both BART and Valley Link and the two garages. It would also serve pedestrians going between BART/Valley Link and RTD, AC Transit, MAX, StaRT and Amtrak Thruway buses parked along the south side of Iron Horse Parkway.

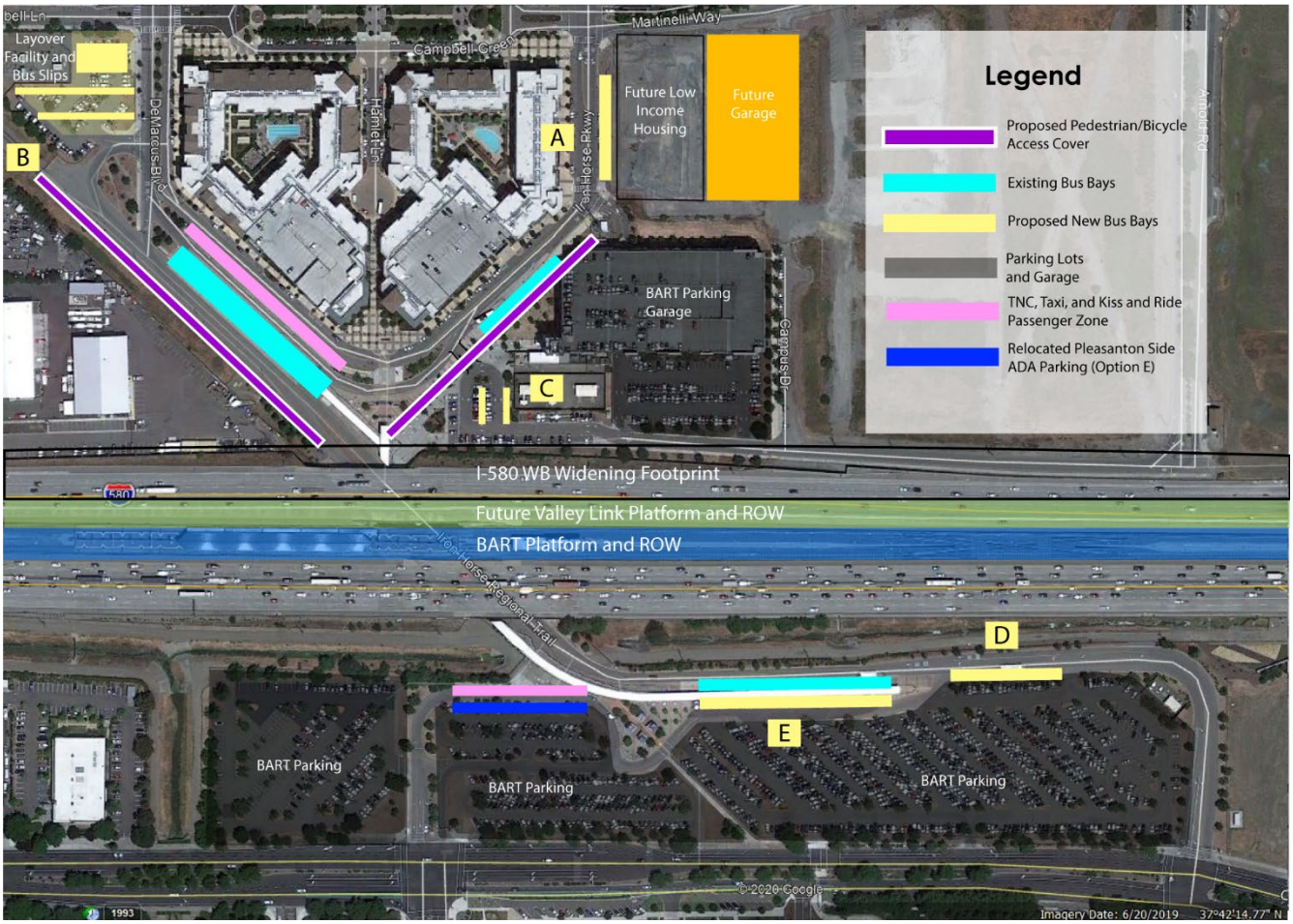
Furthermore, were the Alternative B bus bays to be built, a similar overhead cover could be installed above Iron Horse Trail to offer pedestrians and cyclist protection from the elements as well.

Should the Alternative C bus bays not be implemented, and should the AV shuttle stop be retained at its current location in the employee parking area, the overhead structure could shelter waiting shuttle riders from the sun and the rain.

The aforementioned improvements are shown in **Figure 43**. As these improvements are not dependent on other physical improvements, they can be added at any time.

Figure 42. Overhead Cover Pleasanton Side of Station

Figure 43. Overhead Cover Added to Dublin Side of Station



Shuttle Bus and TNC Parking Opportunities

As noted above, employer shuttles and TNC parking are accommodated on both side of the station. While no specific improvements for these uses are anticipated in this analysis, it is conceivable the employer shuttles can be directed to new bus bays at proposed location Alternatives A through E when implemented, at least until these bays are fully subscribed by transit services. Doing so would free space at TNC designated areas on both sides of the station.

Related Highway Improvements

While not specific to the Dublin/Pleasanton BART Station, various improvements are planned for I-205 and I-580 that will help improve San Joaquin RTD commuter services and other transit services accessing the station.

For I-205, the San Joaquin Council of Governments (SJCOG) is the lead agency for a Managed Lane Project that will consider various options including High Occupancy Toll (HOT), reversible lanes, autonomous vehicle lanes, bus-only lanes, passenger rail improvements, as well as High Occupancy Vehicle (HOV) lanes in both the westbound and eastbound directions between the I-580/Grant Line Road Interchange (post mile (PM) R1.3) in Alameda County (Caltrans District 4) and I-5 located at PM R12.5 in San Joaquin County (Caltrans District 10). The current I-205 facility is six lanes, and this project will add two lanes for a total of eight lanes (four lanes in each direction).

There are also several I-580 interchange projects in various stages of planning and project delivery that will improve the safety and operations along the highway corridor.

7.4 Costs of Dublin/Pleasanton Improvements

The capital cost estimates listed in this section are based on general assumptions for infrastructure and construction; they are presented as conceptual cost estimates. A contingency is included for each item, and construction costs are based on a percentage of the total itemized infrastructure costs.

7.4.1 Costs for More Bus Bays

Table 20 below summarizes the costs associated with each bus bay alternative. Construction of all alternatives require Portland concrete cement (PCC) pavement that can withstand bus movements.

Alternative A requires less site work than the other alternatives, resulting in a lower overall cost; it provides sufficient space for two sawtooth bus bays (approximately 145 feet).

Alternative B is the most robust alternative, adding a restroom and layover facility for drivers and passengers, as well as repaving the existing northwest BART lot with PCC paving. This alternative adds sufficient space for six sawtooth bus bays. However, it may be precluded by BART's development plans for the site.

Alternative C would require repaving the existing employee parking lot with PCC and relocating the employee parking. Due to the circulation pattern required, a new access road to Iron Horse Parkway would need to be added, bisecting the sidewalk along Industrial Parkway so buses could flow out of the site. With various configurations, Alternative C could accommodate two to three bus bays.

Alternative D proposes a new bus island on the southeast side of the station. This site could accommodate two sawtooth bus bays.

Alternative E proposes the conversion of ADA parking on the south side of the Pleasanton side bus island to bus bays, plus relocation of ADA parking nearer to the tunnel entrance.

Table 20. Cost Summary by Scenario in 2020 Dollars

Scenario	Approx. new Bays	Cost ($K)	Cost per Bay ($K)
Alternative A	2	$ 598	$ 299
Alternative B	6	$ 1,930	$ 322
Alternative C	3	$ 1,132	$ 377
Alternative D	2	$ 818	$ 409
Alternative E	4	$ 1,421	$ 355
Note: The estimates include contingency and construction costs.			

Detailed cost sheets for each scenario can be found in **Appendix G**,

7.4.2 Costs for AV Shuttles

In 2020 LAVTA laid out a Shared Autonomous Vehicle (SAV) Business Plan, which covers the progress of the program to date (Phase 1) and outlines the goals and costs of the program into the future (Phase 2). Phase 2 plans to link the Dublin/Pleasanton BART Station to nearby shopping at Persimmon Place and business complexes between Dublin Boulevard and Central Parkway.

Capital costs associated with Phase 2 of the program total $2.7 million, comprised of the following:

- Shared Autonomous Vehicles (4 x $375,000): $1,500,000
- V2I Upgrades (Vehicle to Infrastructure): communication with intersection traffic lights: (2 x $250,000): $500,000
- Mobility Hub: $350,000
- Software Updates/Signage: $100,000
- Bike/Scooter Share Program: $250,000

Operating costs for Phase 2 are estimated to total $4.4 million annually, comprised of:

- Shared Autonomous Vehicles: $4.3 million/year; assumptions:
  - 3 revenue vehicles and 1 spare vehicle (5-10-minute headways)
  - 10 hours/day, Mon-Fri
  - Safety operators are unionized
  - Transdev is a turnkey operator
- TDM Marketing Budget: $75,000/year

Farebox revenue resulting from the program is predicted to reach $417,600 annually, based on an average ridership of 26 rides per hour and 800 rides per day.

7.4.3 Costs for Wayfinding Signage

Appendix H includes the conceptual cost estimate for wayfinding signage improvements. The improvements are estimated to cost $53,157 in 2020 dollars, inclusive of contingency and construction costs.

7.4.4 Costs for Bike and Scooter Improvements

This report plans for 10 more bike lockers to be added at Dublin/Pleasanton BART Station. The lockers are estimated to costs $27,500 in 2020 dollars, inclusive of contingency and construction costs.
Because of the decentralized nature of scooters, costs associated with their deployment and maintenance would be borne by their private owners and operators.

Cost estimates are shown in greater detail in **Appendix I.**

7.4.5 Costs for Sidewalk Covers

Appendix J includes the conceptual cost estimate of overhead covering of sidewalks at the station, providing shade in summer and protection from rain in the winter. The improvements are estimated to cost $458,300 in 2020 dollars, inclusive of contingency and construction costs.

7.5 Next Steps for Improvements at the Tri-Valley Hub

BART and transit service operators using the Dublin/Pleasanton BART Station have a common interest in ensuring the ability of the station to serve their respective transit riders. The interest is shared with the station's newest likely user, Valley Link, a regional rail service connecting Tracy and later North Lathrop with the BART at Dublin/Pleasanton. All these agencies, along with the local jurisdictions, need to work together to ensure the facility has the latest improvements facilitating efficient and safe transfers.

This report includes several ideas of how transfers can be facilitated moving forward. Some or all may be appropriate answers, pending on a number of factors, such as changes in local demographics, land uses, and commute and travel patterns. In the fullness of time, other ideas may show themselves to be even better solutions to the unfolding demand.

Accordingly, this report recommends that BART, all existing and likely station users, and the cities of Dublin and Pleasanton regularly meet and discuss the mission of the Dublin/Pleasanton BART Station as the Tri-Valley Hub and engage in periodic reviews of ways that this station can continuously improve rail and transit connections.

Appendix A – Socioeconomic Data

A.1 Demographics

The following table shows the socioeconomic profiles of the main cities along the corridors in the study area. They are broken down by age, income, race, ethnicity, and biological sex. Data is sourced from the 2017 ACS.

City	Concord		Walnut Creek		Martinez		Pleasant Hill		San Ramon		Dublin		Pleasanton		Livermore	
Age																
Age 29 or younger	10,157	22%	3,981	16%	2,793	20%	2,289	19%	4,635	15%	3,599	16%	5,237	17%	7,049	19%
Age 30 to 54	26,222	56%	14,050	58%	7,791	55%	6,699	56%	20,378	65%	14,614	66%	18,600	60%	21,330	57%
Age 55 or older	10,844	23%	6,333	26%	3,484	25%	2,995	25%	6,490	21%	3,974	18%	7,290	23%	9,165	24%
Monthly Income																
$1,250 per month or less	7,083	15%	2,779	11%	1,869	13%	1,672	14%	3,243	10%	2,243	10%	3,471	11%	4,742	13%
$1,251 to $3,333 per month	13,098	28%	4,264	18%	3,304	23%	2,637	22%	4,794	15%	3,812	17%	5,127	16%	7,947	21%
More than $3,333 per month	27,042	57%	17,321	71%	8,895	63%	7,674	64%	23,466	74%	16,132	73%	22,529	72%	24,855	66%
Race																
White Alone	34,911	74%	18,607	76%	11,122	79%	9,168	77%	16,382	52%	10,898	49%	18,680	60%	29,253	78%
Black or African American Alone	2,269	5%	767	3%	577	4%	371	3%	1,061	3%	1,144	5%	732	2%	1,009	3%
American Indian or Alaska Native Alone	420	1%	150	1%	100	1%	48	0%	131	0%	122	1%	147	0%	277	1%
Asian Alone	7,543	16%	4,023	17%	1,690	12%	1,936	16%	12,888	41%	9,142	41%	10,573	34%	5,598	15%
Native Hawaiian or Other Pacific Islander Alone	280	1%	63	0%	59	0%	40	0%	98	0%	87	0%	83	0%	162	0%
Two or More Race Groups	1,800	4%	754	3%	520	4%	420	4%	943	3%	794	4%	912	3%	1,245	3%
Ethnicity																
Not Hispanic or Latino	35,001	74%	21,707	89%	11,999	85%	10,419	87%	28,529	91%	19,526	88%	27,960	90%	30,980	83%
Hispanic or Latino	12,404	26%	2,657	11%	2,069	15%	1,564	13%	2,974	9%	2,661	12%	3,167	10%	6,564	17%
Sex																
Male	24,593	52%	12,924	53%	7,255	52%	6,194	52%	17,735	56%	12,383	56%	17,933	58%	21,147	56%
Female	22,630	48%	11,440	47%	6,813	48%	5,789	48%	13,768	44%	9,804	44%	13,194	42%	16,397	44%

Source: 2017 ACS

(A.1 Continued)

City	Tracy		Manteca		Stockton		Suisun-Fairfield		Benicia	
Age										
Age 29 or younger	7,196	25%	7,209	23%	28,748	25%	14,186	23%	2,521	18%
Age 30 to 54	16,542	56%	17,693	56%	64,518	55%	34,444	55%	7,405	54%
Age 55 or older	5,590	19%	6,620	21%	23,750	20%	13,547	22%	3,902	28%
Monthly Income										
$1,250 per month or less	4,728	16%	6,206	20%	27,221	23%	12,892	21%	2,617	19%
$1,251 to $3,333 per month	9,423	32%	9,827	31%	43,776	37%	18,269	37%	3,255	24%
More than $3,333 per month	15,177	52%	15,489	49%	46,019	39%	31,016	47%	7,956	58%
Race										
White Alone	19,823	68%	24,318	77%	66,586	57%	35,323	57%	10,206	74%
Black or African American Alone	2,085	7%	1,711	5%	14,644	13%	10,374	17%	999	7%
American Indian or Alaska Native Alone	387	1%	484	2%	1,774	2%	629	1%	105	1%
Asian Alone	5,377	18%	3,520	11%	28,179	24%	11,800	19%	1,846	13%
Native Hawaiian or Other Pacific Islander Alone	319	1%	214	1%	971	1%	639	1%	65	0%
Two or More Race Groups	1,337	5%	1,275	4%	4,862	4%	3,412	5%	607	4%
Ethnicity										
Not Hispanic or Latino	19,194	65%	20,589	65%	74,236	63%	46,294	74%	11,869	86%
Hispanic or Latino	10,134	35%	10,933	35%	42,780	37%	15,883	26%	1,959	14%
Sex										
Male	16,007	55%	16,645	53%	58,475	50%	30,460	49%	6,654	48%
Female	13,321	45%	14,877	47%	58,541	50%	31,717	51%	7,174	52%

Source: 2017 ACS

A.2 Historical Job Growth

	City														
Year	Dublin	Pleasanton	Livermore	Suisun	Fairfield	Benicia	Martinez	Concord	Pleasant Hill	Walnut Creek	Danville	San Ramon	Stockton	Tracy	Manteca
2017	19,619	68,294	51,413	3,056	40,327	13,276	20,558	56,949	19,708	58,025	12,371	43,645	109,353	29,920	16,862
2016	19,468	66,439	48,230	2,900	39,485	12,367	20,190	56,008	19,717	57,448	12,150	44,289	108,480	26,728	16,540
2015	19,064	63,750	46,747	2,683	38,963	12,841	20,422	52,793	17,856	55,896	11,571	42,146	105,703	23,747	16,180
2014	17,660	61,022	44,334	2,640	37,630	12,000	19,926	49,153	18,213	55,257	10,904	42,402	99,221	19,751	15,198
2013	16,674	58,332	41,215	2,432	36,454	11,771	20,323	50,616	17,794	55,844	10,628	42,203	98,822	18,654	14,492
2012	16,099	54,903	41,216	2,568	36,310	11,953	19,743	49,219	17,445	55,819	9,968	40,944	97,508	17,473	14,272
2011	14,667	53,949	40,581	3,055	37,373	11,374	19,893	48,942	17,821	54,514	10,199	41,335	97,936	16,198	14,345
2010	13,891	50,050	41,445	2,753	37,827	11,684	21,017	46,838	17,093	52,173	12,110	35,758	98,101	15,735	14,240
2009	13,276	52,548	40,610	3,094	35,242	11,777	21,133	50,355	16,935	52,719	12,188	33,492	97,729	16,453	13,325
2008	13,987	58,632	44,204	3,048	37,777	12,807	22,078	54,766	18,106	54,507	12,713	34,791	100,029	17,814	13,882
2007	14,290	59,630	45,745	3,144	37,949	12,243	21,667	55,230	17,472	55,878	12,436	35,906	101,113	17,984	13,971
Total New Jobs	**5,329**	**8,664**	**5,668**	**-88**	**2,378**	**1,033**	**-1,109**	**1,719**	**2,236**	**2,147**	**-65**	**7,739**	**8,240**	**11,936**	**2,891**
Percent Change	37%	15%	12%	-3%	6%	8%	-5%	3%	13%	4%	-1%	22%	8%	66%	21%

Source: 2007-2017 ACS

A.3 Historical Population Growth

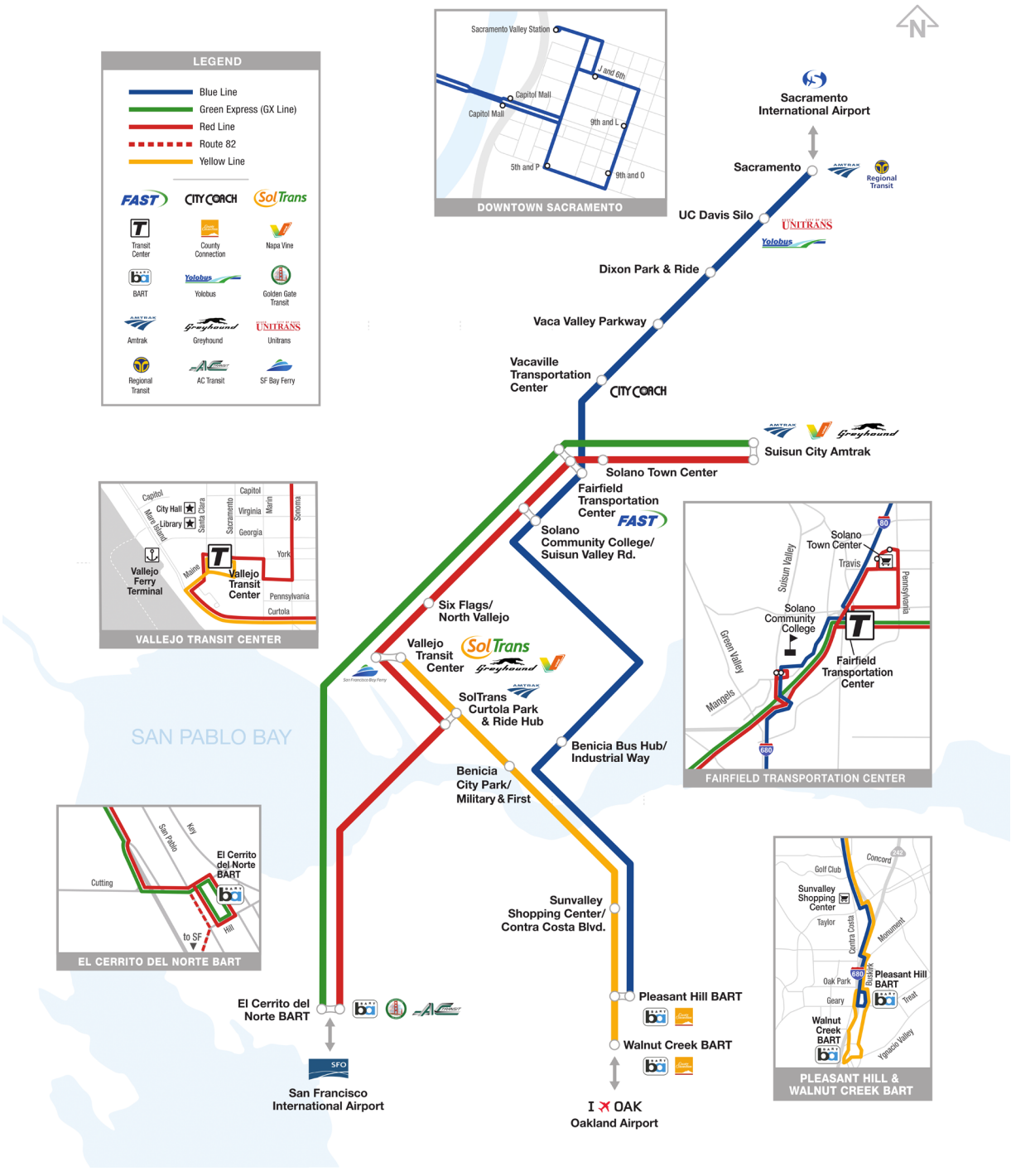
	City														
Year	Dublin	Pleasanton	Livermore	Suisun	Fairfield	Benicia	Martinez	Concord	Pleasant Hill	Walnut Creek	Danville	San Ramon	Stockton	Tracy	Manteca
2017	60,939	83,007	90,295	29,639	116,266	28,343	38,373	129,783	34,987	69,773	19,392	75,931	310,496	90,889	79,268
2016	59,682	82,467	89,682	29,496	114,776	28,183	38,272	129,172	34,954	69,332	19,353	75,810	307,270	89,290	76,935
2015	57,635	79,391	88,374	29,391	112,642	28,079	38,108	128,464	34,776	68,853	19,099	75,260	304,723	87,064	75,192
2014	54,673	77,635	87,201	29,168	110,913	27,853	37,549	127,346	34,476	67,635	16,764	74,484	301,373	85,864	73,287
2013	52,131	74,179	85,613	28,755	109,255	27,588	37,193	126,088	34,147	66,933	16,213	73,701	297,743	85,006	71,871
2012	48,784	72,227	83,970	28,542	107,579	27,381	36,883	124,840	33,808	65,630	15,923	72,967	297,162	84,824	70,956
2011	46,838	71,190	82,635	28,325	106,257	27,170	36,533	123,588	33,469	64,880	15,861	72,236	295,208	84,319	69,246
2010	45,910	70,393	81,593	28,142	105,557	27,029	36,171	122,521	33,189	64,338	20,629	71,614	292,497	83,569	67,677
2009	44,731	67,747	81,391	27,038	103,694	26,194	35,704	122,766	32,669	64,239	18,927	49,689	288,533	79,382	65,993
2008	44,181	66,834	80,234	26,899	103,541	26,122	35,329	121,472	32,354	63,437	19,529	49,162	286,452	78,857	64,979
2007	43,573	66,048	78,980	26,842	103,543	26,178	35,081	120,615	32,178	62,994	20,718	48,680	285,684	79,073	63,783
Pop Change	**17,366**	**16,959**	**11,315**	**2,797**	**12,723**	**2,165**	**3,292**	**9,168**	**2,809**	**6,779**	**-1,326**	**27,251**	**24,812**	**11,816**	**15,485**
Percent Change	40%	26%	14%	10%	12%	8%	9%	8%	9%	11%	-6%	56%	9%	15%	24%

Source: 2007-2017 ACS

Appendix B - Transit Service Maps

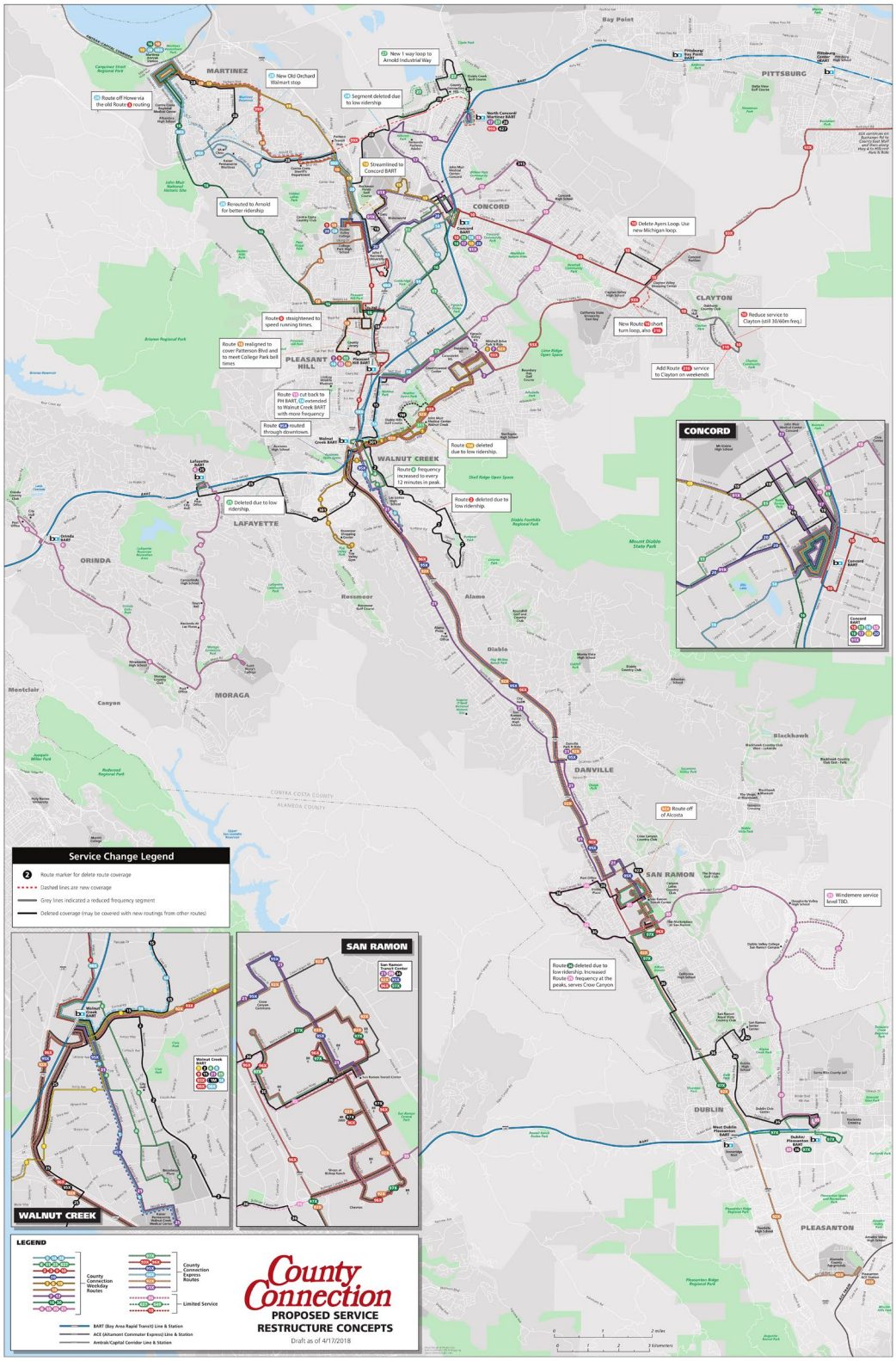
The following pages contain transit service maps for the SolanoExpress, County Connection, and Wheels.

B.1 SolanoExpress



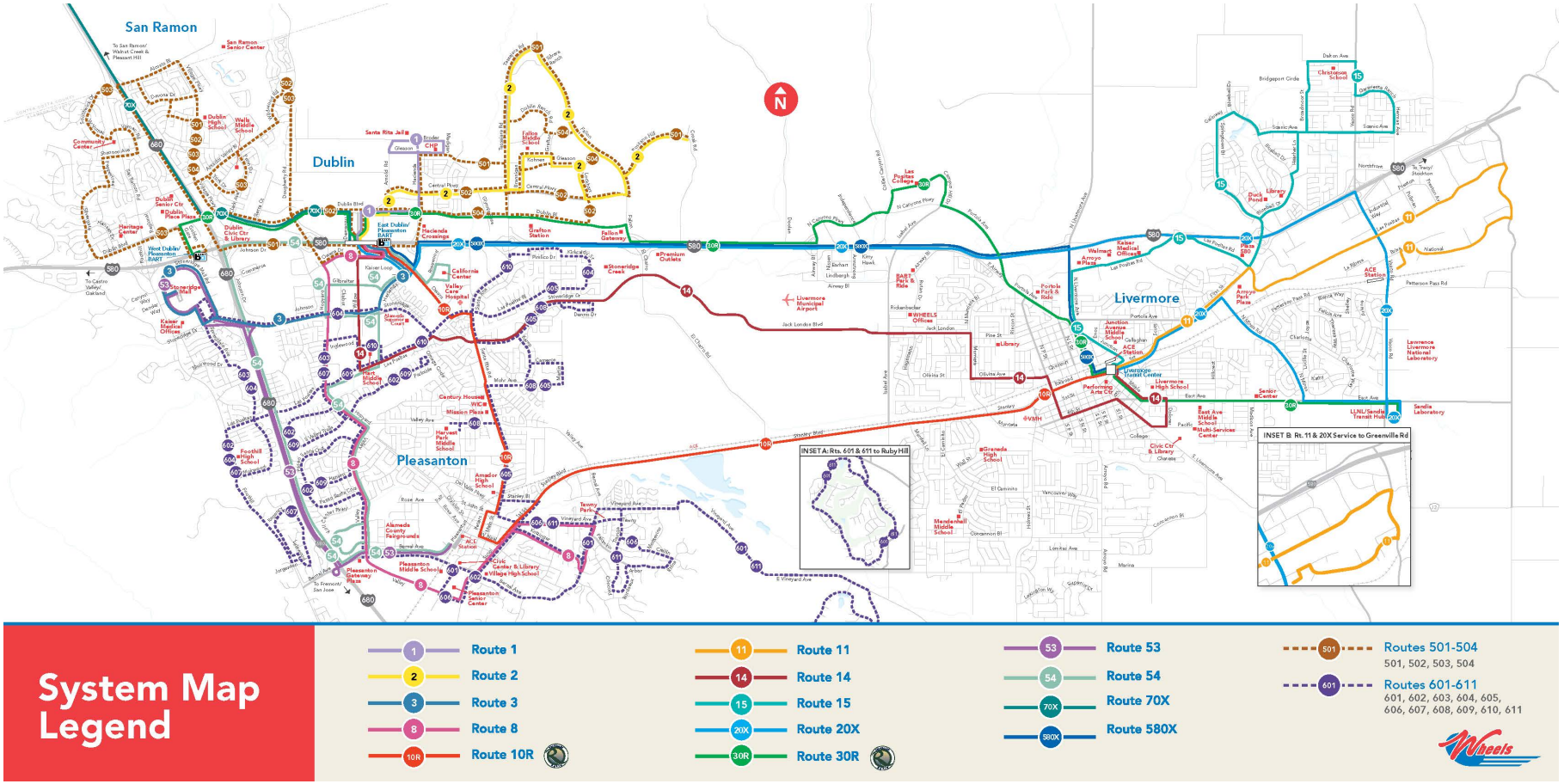
Source: [SolanoExpress]

B.2 County Connection



Source: [County Connection]

B.3 Wheels



Source: [Wheels]

Appendix C – Express Bus Stop Access and Egress Maps

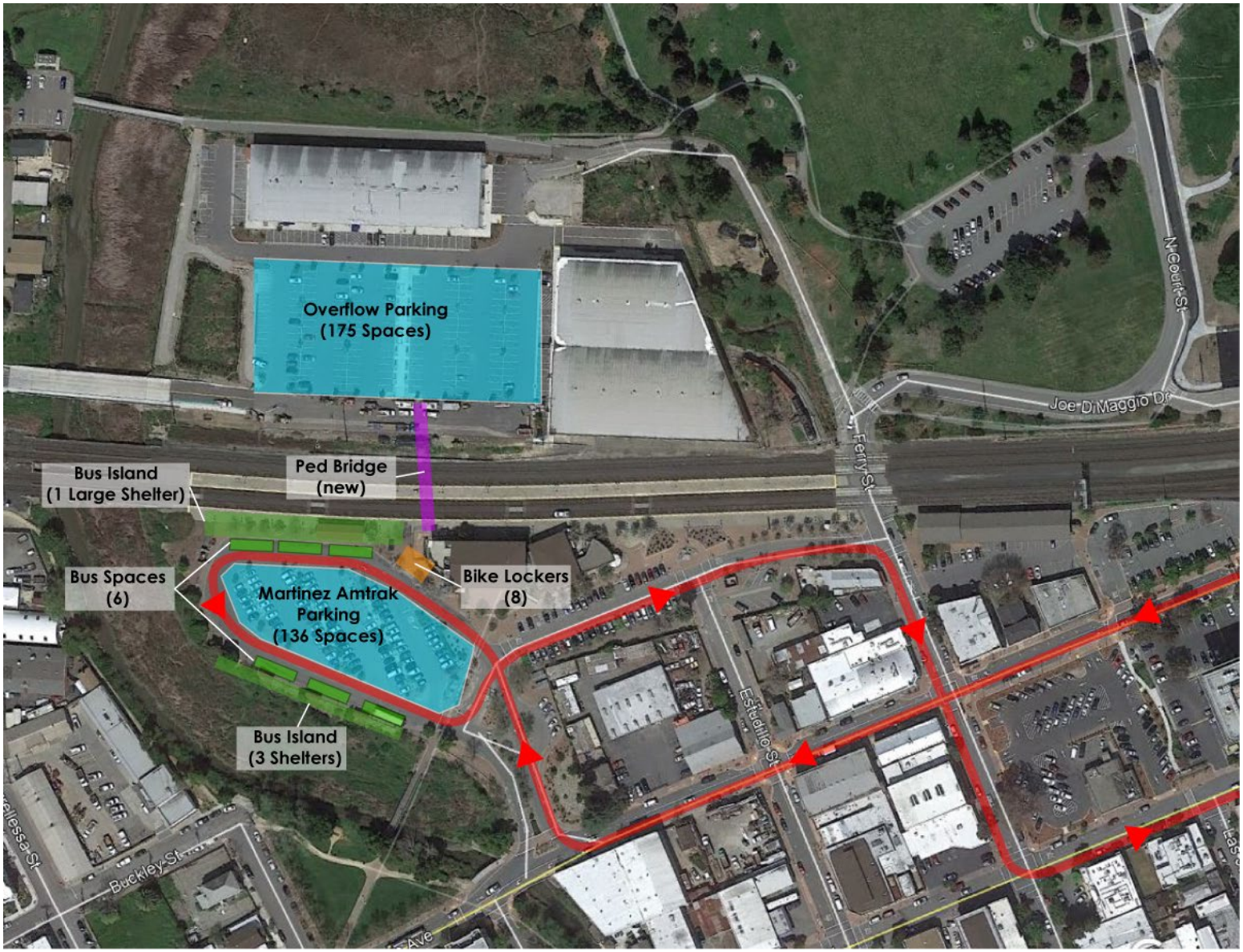
In the following illustrations:

- The red arrows represent the circulation of buses between the bus bays and the corridor.
- Orange represents bike facilities.
- Purple represents pedestrian infrastructure.
- Blue represents parking facilities.
- Green represents bus loading areas.

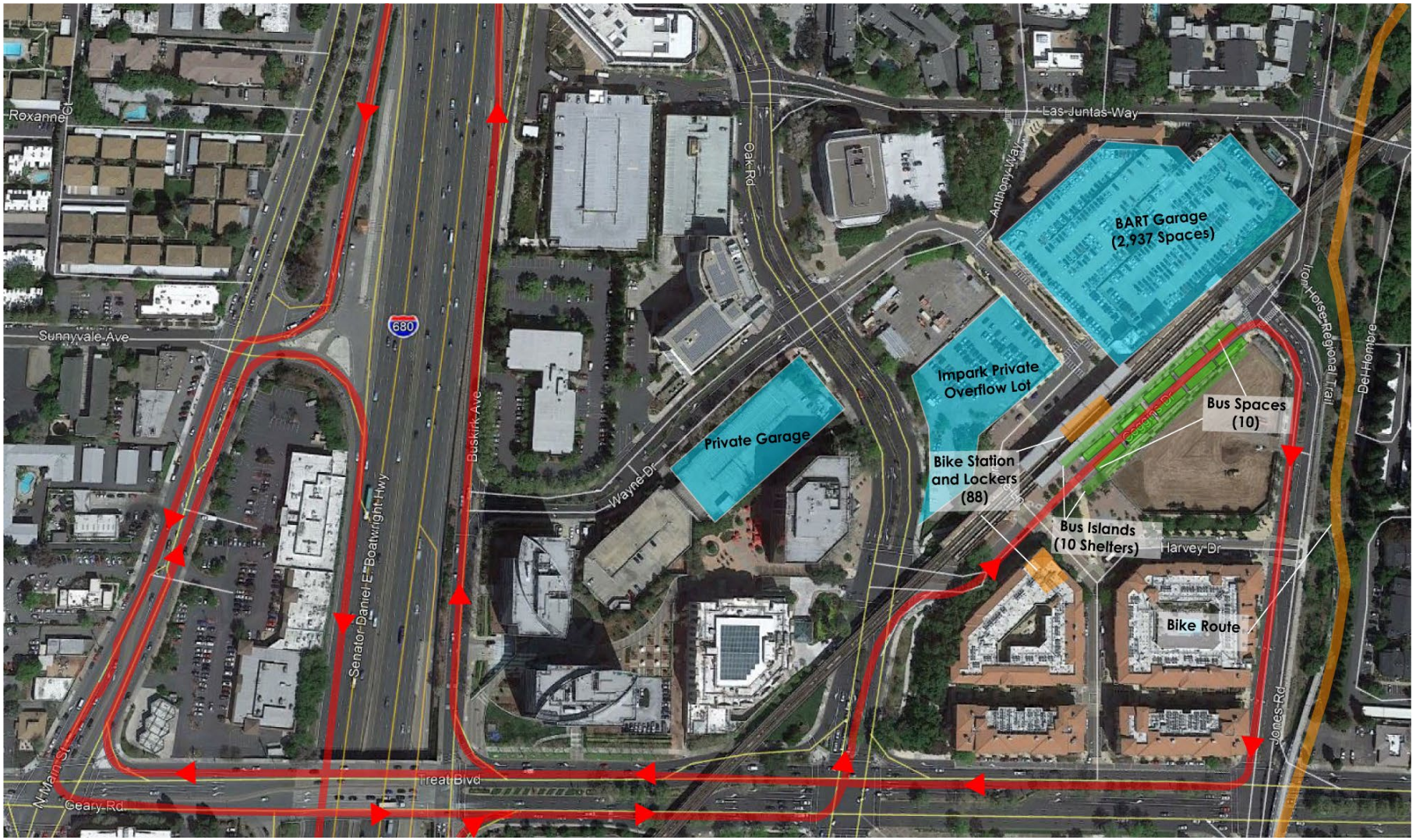
Details regarding the routes can be found in the **3.1 Sketch Level Facilities Needs** section.

C.1 Suisun-Fairfield Amtrak Station

C.2 Martinez Amtrak Station

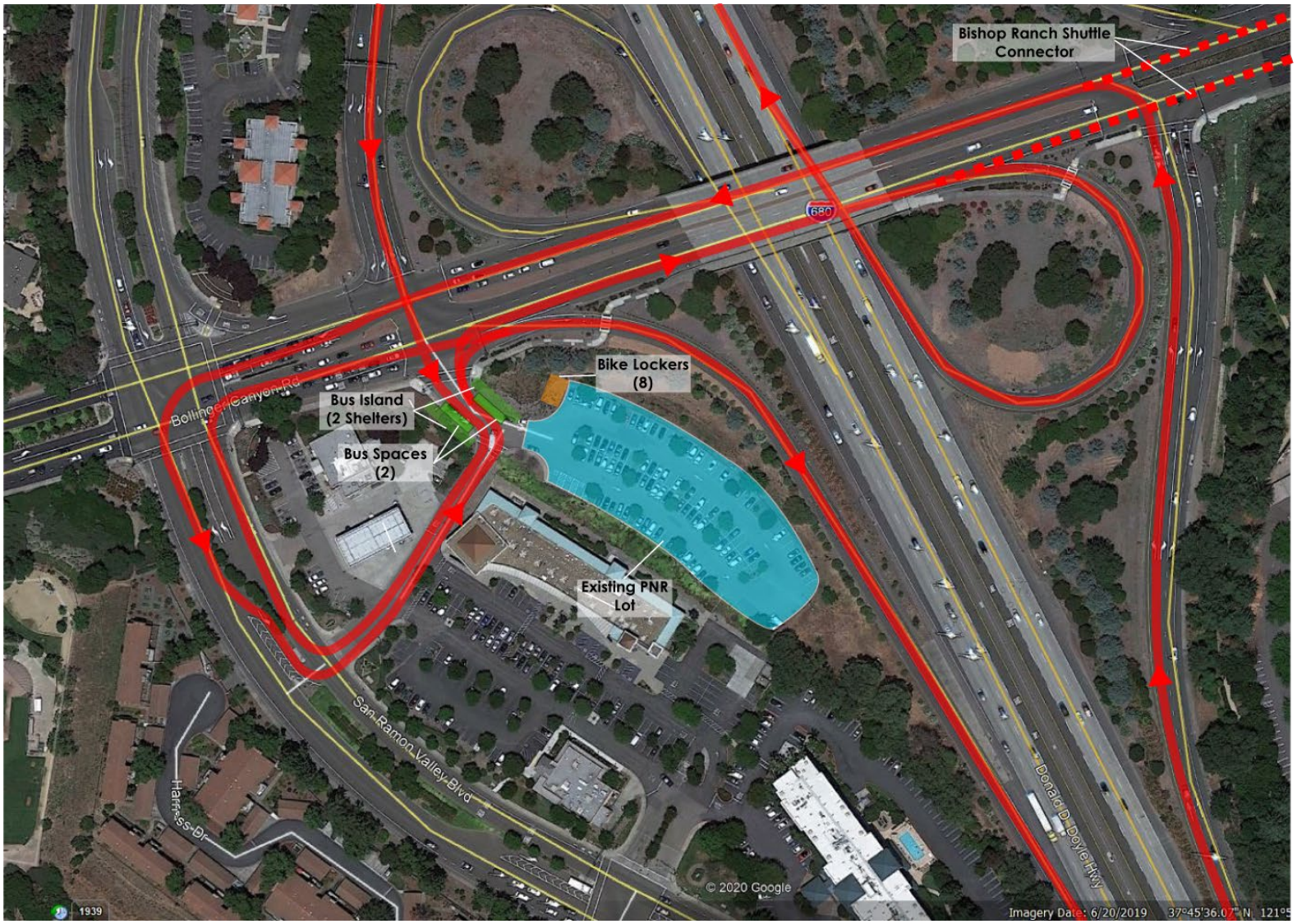


C.3 Pleasant Hill / Contra Costa Centre BART Station

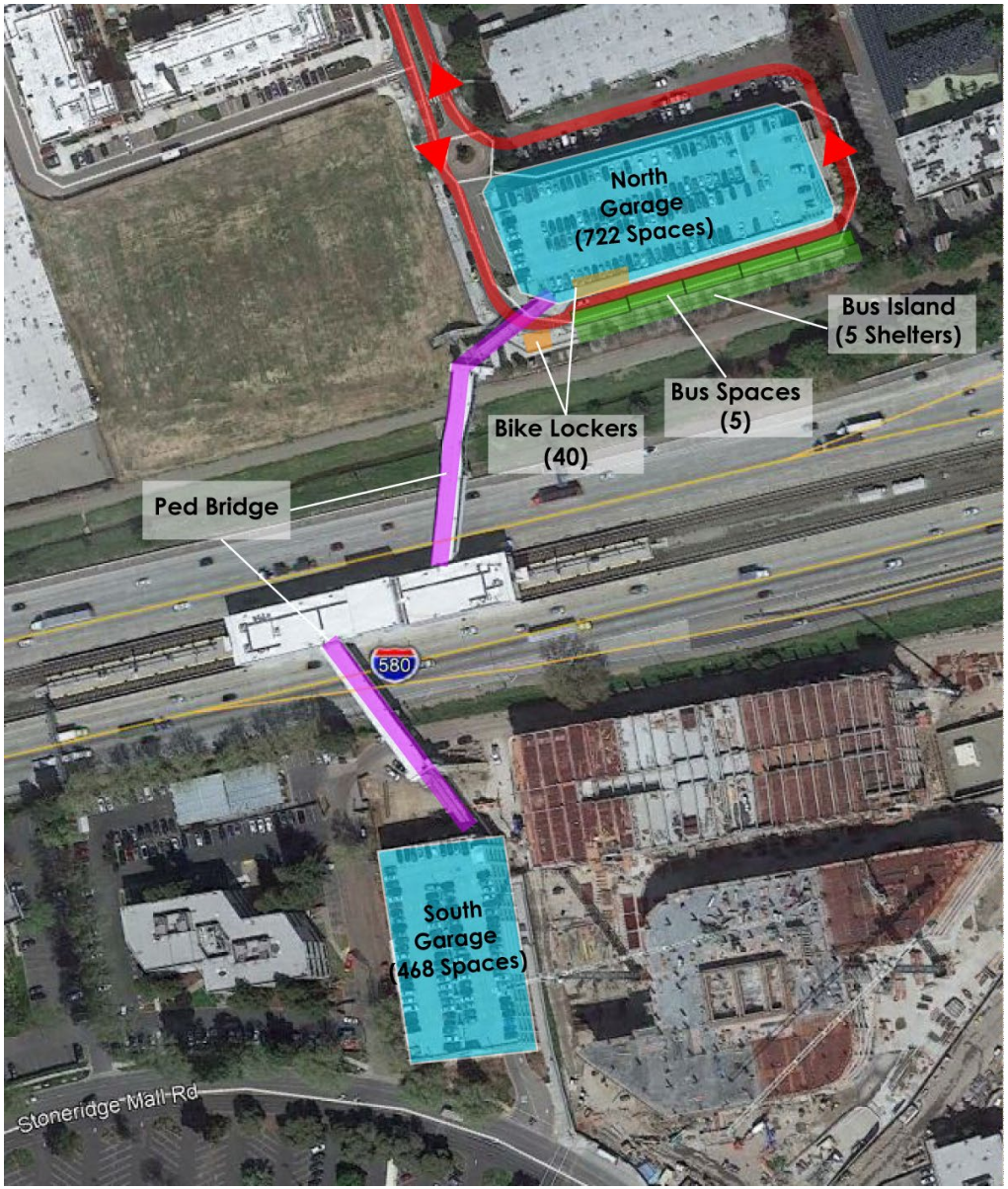


C.4 Walnut Creek BART Station

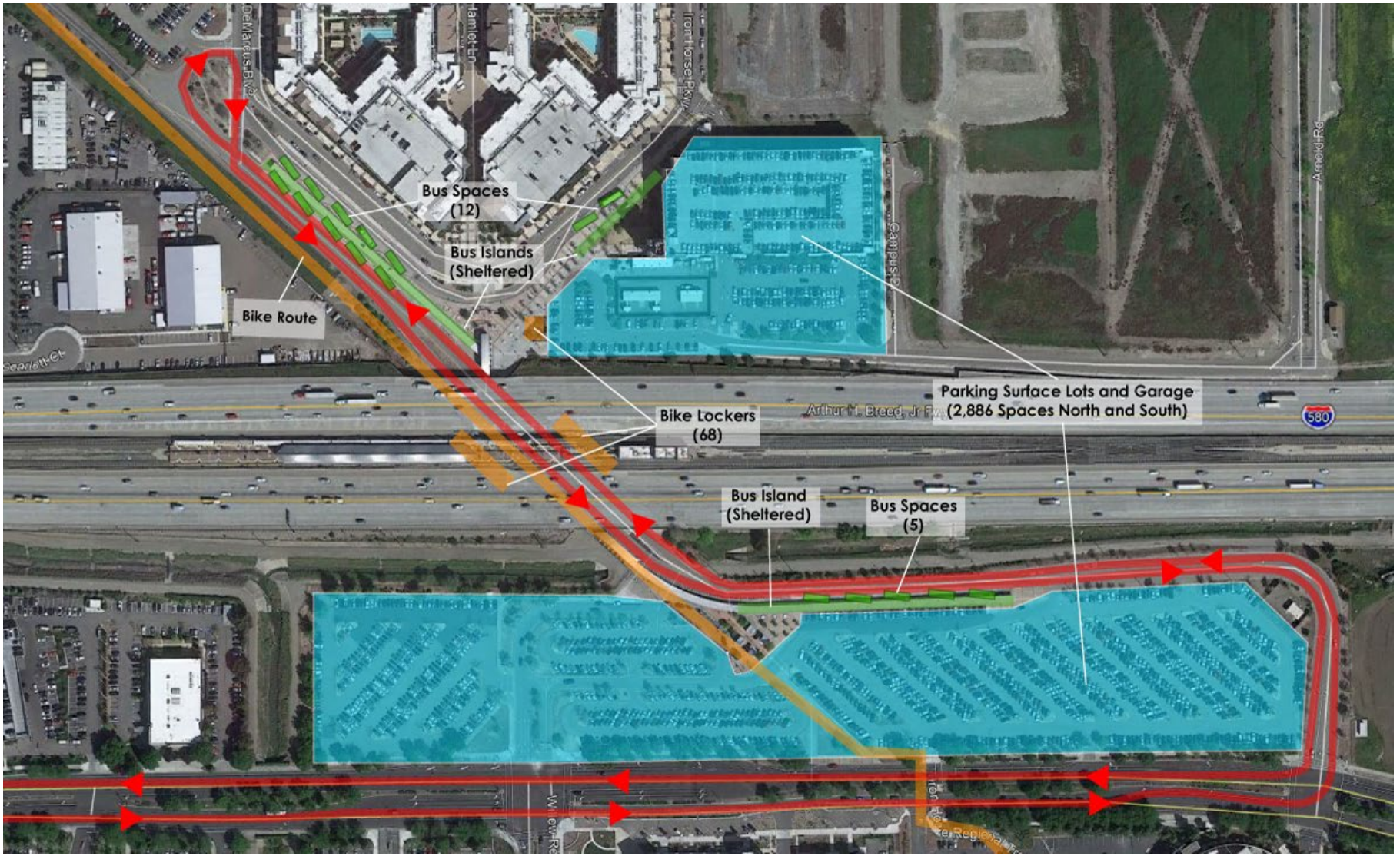
C.5 Bollinger Canyon Park-and-Ride



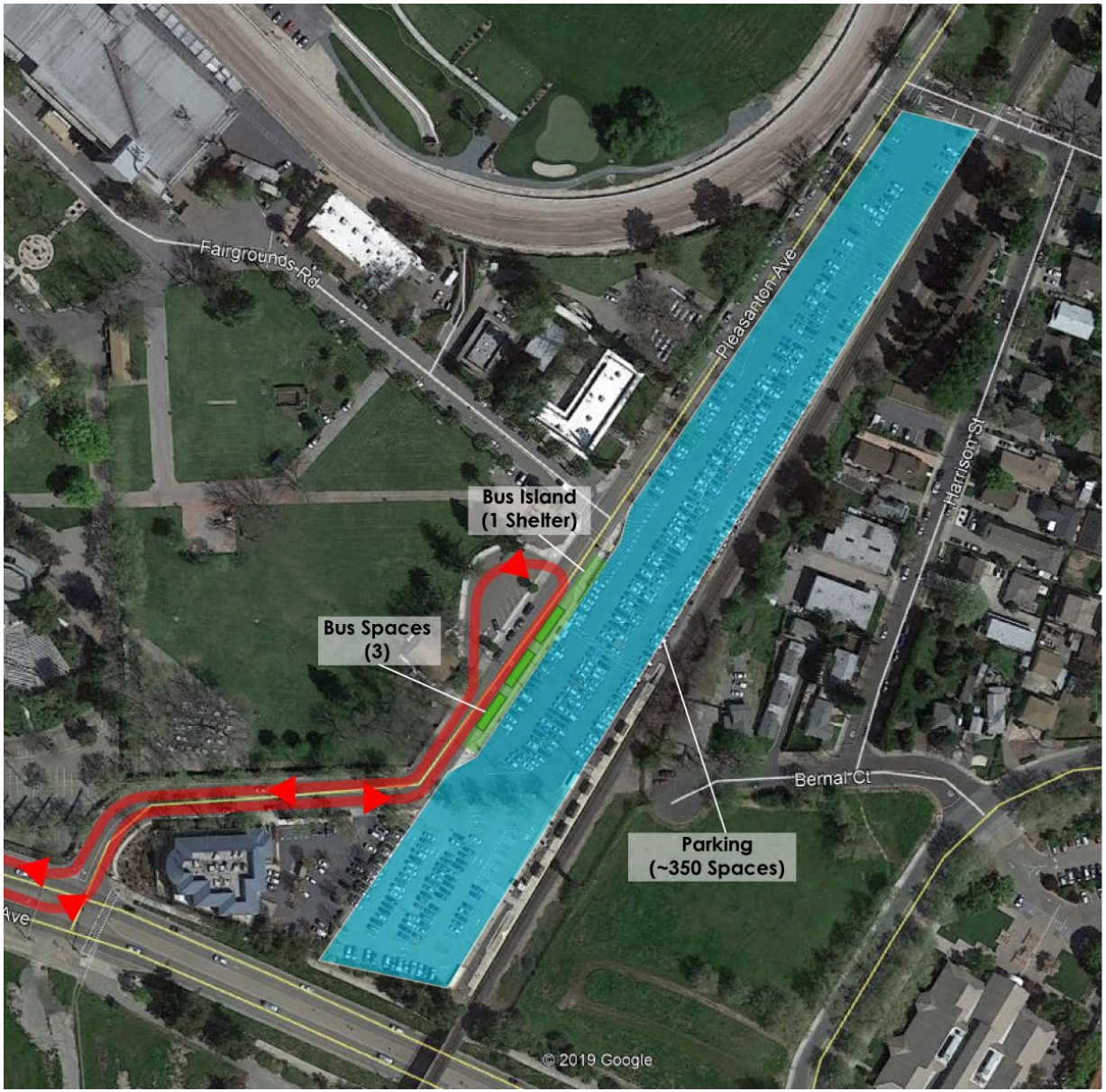
C.6 West Dublin/Pleasanton BART Station



C.7 Dublin/Pleasanton BART Station



C.8 Pleasanton ACE Station



Appendix D – Potential Express Bus Transit Connections

Proposed Bus Stop	Connecting Service	Type	Route/Line (if applicable)
Suisun-Fairfield Amtrak Station	Capitol Corridor	Rail	N/A
	SolanoExpress	Bus	R route
	VINE	Bus	Route 21
	Fairfield and Suisun Transit (FAST)	Bus	Route 5
	Fairfield and Suisun Transit (FAST)	Bus	Green Express
	Delta Breeze	Bus	Route 50
Martinez Amtrak Station	San Joaquins	Rail	N/A
	Capitol Corridor	Rail	N/A
	California Zephyr	Rail	N/A
	Coast Starlight	Rail	N/A
	Amtrak Thruway	Bus	N/A
	Tri-Delta Transit	Bus	Route 200
	WestCAT	Bus	Route 30Z
	County Connection	Bus	Route 16
	County Connection	Bus	Route 18
	County Connection	Bus	Route 19
	County Connection	Bus	Route 28
	County Connection	Bus	Route 98X
	County Connection	Bus	Route 99X
	County Connection	Bus	Route 316
Pleasant Hill/Contra Costa Centre BART Station	BART	Rail	Yellow Line
	SolanoExpress	Bus	Blue Line (FAST)
	SolanoExpress	Bus	Yellow Line (SolTrans)
	AC Transit	Bus	Route 702 - Early Bird
	County Connection	Bus	Route 712 - Early Bird
	County Connection	Bus	Route 7
	County Connection	Bus	Route 9
	County Connection	Bus	Route 11
	County Connection	Bus	Route 14

Proposed Bus Stop	Connecting Service	Type	Route/Line (if applicable)
	County Connection	Bus	Route 15
	County Connection	Bus	Route 18
	County Connection	Bus	Route 311
	County Connection	Bus	Route 316
	Wheels	Bus	Line 70X
Walnut Creek BART Station	BART	Rail	Yellow Line
	Wheels	Bus	Line 70X
	SolanoExpress	Bus	Yellow Line (SolTrans)
	County Connection	Bus	Route 1
	County Connection	Bus	Route 4
	County Connection	Bus	Route 5
	County Connection	Bus	Route 9
	County Connection	Bus	Route 14
	County Connection	Bus	Route 21
	County Connection	Bus	Route 93X
	County Connection	Bus	Route 95X
	County Connection	Bus	Route 96X
	County Connection	Bus	Route 98X
	County Connection	Bus	Route 311
	County Connection	Bus	Route 321
	County Connection	Bus	Route 601
	County Connection	Bus	Alamo Creek Shuttle
West Dublin/Pleasanton BART Station	BART	Rail	Blue Line
	Wheels	Bus	Route 30R
	Wheels	Bus	Route 3
	Wheels	Bus	Route 53
Dublin/Pleasanton BART Station	BART	Rail	Blue Line
	Amtrak Thruway	Bus	N/A
	County Connection	Bus	Route 35
	County Connection	Bus	Route 97X
	County Connection	Bus	Route 335
	Wheels	Bus	Route 1
	Wheels	Bus	Route 2
	Wheels	Bus	Route 3

Proposed Bus Stop	Connecting Service	Type	Route/Line (if applicable)
	Wheels	Bus	Route 8
	Wheels	Bus	Route 10R
	Wheels	Bus	Route 14
	Wheels	Bus	Route 20X
	Wheels	Bus	Route 30R
	Wheels	Bus	Route 54
	Wheels	Bus	Route 70X
	Wheels	Bus	Route 502
	Wheels	Bus	Route 580X
	AC Transit	Bus	Line 703
	Stanislaus Regional Transit	Bus	StaRT Commuter
	Modesto Area Express	Bus	BART Express
	San Joaquin RTD	Bus	Route 150
Pleasanton ACE Station	ACE	Rail	N/A
	County Connection	Bus	Route 92X
	Wheels	Bus	Route 53
	Wheels	Bus	Route 54

Appendix E – Travel Time Analysis

This appendix compares the travel time competitiveness of existing transit options, the proposed express bus, and personal car. While the results indicate the car is the fastest option, the proposed express bus service is much faster than the current I-680 transit options (Capitol Corridor to County Connection 98X, County Connection 35, and County Connection 21) as well as the Capitol Corridor to BART option (transfer at Richmond).

Sacramento to Tri-Valley Hub

A) By Car	Distance	Time (High)	Time (Low)	Average	**Total**
Peak	89.4	2:00	1:25	1:42	**1:42**
Off Peak	89.4	1:25	1:25	1:25	**1:25**

	Sacramento to Suisun		Suisun to Tri Valley Hub		
B) By Study Express Bus and Capitol Corridor	Distance	Time	Distance	Time	**Total**
Peak	44.3	0:41	54	1:22	**2:03**
Off Peak	44.3	0:41	54	1:11	**1:52**

C) By Current I-680 Transit	Distance	Time	**Total**
Peak	n/a	3:28	**3:28**
Off Peak	n/a	3:27	**3:27**

D) By Capitol Corridor to BART	Distance	Time	**Total**
Peak and Off Peak	n/a	2:42	**2:42**

Tri-Valley Hub to Sacramento

A) By Car	Distance	Time (High)	Time (Low)	Average	**Total**
Peak	89.9	1:50	1:20	1:35	**1:35**
Off Peak	89.9	1:40	1:20	1:30	**1:30**

	Suisun to Sacramento		Tri-Valley Hub to Suisun		
B) By Study Express Bus and Capitol Corridor	Distance	Time	Distance	Time	**Total**
Peak	45.1	0:55	54.7	1:48	**2:43**
Off Peak	45.1	0:55	54.7	1:16	**2:11**

C) By Current I-680 Transit	Distance	Time	**Total**
Peak	n/a	4:12	**4:12**
Off Peak	n/a	3:41	**3:41**

D) By BART to Capitol Corridor	Distance	Time	**Total**
Peak and Off Peak	n/a	3:07	**3:07**

Appendix F – Express Bus Schedule for Option B

Southbound								
WB (SB) Capitol Corridor	San Joaquins (NB)	Martinez Amtrak	Walnut Creek BART	Bollinger PNR	D/P BART	Pleasanton ACE	ACE Westbound	Total Runtime
5:31		5:34	5:50	6:07	6:22	6:43	6:48	1:09
6:31		6:36	6:52	7:09	7:24	7:45	7:53	1:09
		7:05	7:21	7:38	7:53	8:14	8:18	1:09
7:21		7:24	7:40	7:57	8:12			0:48
8:06		8:25	8:41	8:58	9:10			0:45
8:34	9:30	9:39	9:58	10:13	10:25			0:46
		9:59	10:18	10:33	10:45			0:46
11:11		11:24	11:43	11:58	12:10			0:46
		12:39	12:58	13:13	13:25			0:46
13:11	13:30	13:33	13:52	14:07	14:19			0:46
		14:23	14:42	14:57	15:09	15:24		1:01
15:11		15:24	15:43	15:58	16:10	16:25		1:01
16:36		16:49	17:08	17:23	17:35	17:50		1:01
	17:31	17:34	17:53	18:08	18:20	18:35		1:01
	19:31	19:34	19:53	20:08	20:20			0:46
19:56		20:08	20:27	20:42	20:54			0:46
	21:30	21:33	21:52	22:07	22:19			0:46

Northbound

ACE Eastbound	Pleasanton ACE	D/P BART	Bollinger PNR	Walnut Creek BART	Martinez Amtrak	San Joaquins SB	EB (NB) Capitol Corridor	Total Runtime
	6:53	7:09	7:24	7:40	7:59	8:25	8:48	1:06
	7:55	8:11	8:26	8:42	9:01			1:06
	8:31	8:47	9:02	9:18	9:37			1:06
		9:30	9:45	10:01	10:20	10:25		0:50
		10:05	10:20	10:36	10:55		11:27	0:50
		11:30	11:45	12:01	12:20	12:25		0:50
		11:57	12:12	12:28	12:47		13:20	0:50
		13:30	13:45	14:01	14:20	14:25	14:28	0:50
		14:05	14:20	14:36	15:03		15:55	0:58
		14:40	14:56	15:23	15:50		16:40*	1:10
16:28	16:31	16:47	17:03	17:30	17:57	18:25	17:19*	1:26
17:28	17:37	17:53	18:09	18:36	19:03		18:28*	1:26
18:28	18:31	18:47	19:03	19:19	19:38		19:15	1:07
19:31	19:34	19:47	20:02	20:18	20:37			1:03
		20:33	20:48	21:04	21:23		21:27	0:50
		21:48	22:03	22:19	22:38			0:50
		22:19	22:34	22:50	23:09		23:13	0:50

**Note: Text in white represents bus to train connections that cannot be realistically made with the service pattern.*

Appendix G – Conceptual Cost Estimates by Alternative

Bollinger Canyon PNR Improvements Capital Costs

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Bollinger PNR**					**$270,190**	
1.01	Covered Waiting Area	$ 25,000.00	2	$ 50,000.00	30%	$65,000	
1.02	Bus Curbs		2			$75,270	Total of Italics
1.03	*AC and Base Removal*	*$ 3.00*	*550*	*$ 1,650.00*	*30%*	*$2,145*	Square Feet
1.04	*Curb / Curb and Gutter Removal*	*$ 5.00*	*60*	*$ 300.00*	*30%*	*$390*	Linear Feet
1.05	*PCC Paving w/AB (Bus)*	*$ 25.00*	*800*	*$ 20,000.00*	*30%*	*$26,000*	Square Feet
1.06	*PCC Paving w/AB (Sidewalk)*	*$ 10.00*	*550*	*$ 5,500.00*	*30%*	*$7,150*	Square Feet
1.07	*Curb / Curb and Gutter w/AB*	*$ 25.00*	*60*	*$ 1,500.00*	*30%*	*$1,950*	Linear Feet
1.08	Waste bins	$ 1,000.00	2	$ 2,000.00	30%	$2,600	
1.09	Display Cases	$ 6,000.00	1	$ 6,000.00	30%	$7,800	
1.10	Lighting	$ 25,000.00	1	$ 25,000.00	30%	$32,500	
1.11	Misc. Electrical	$ 40,000.00	1	$ 40,000.00	30%	$52,000	
1.12	PG&E Service	$ 15,000.00	1	$ 15,000.00		$15,000	
1.13	Security Pole	$ 3,400.00	1	$ 3,400.00	30%	$4,420	
1.14	Bike Lockers	$ 1,500.00	8	$ 12,000.00	30%	$15,600	
2.0	**Construction**					**$178,325**	
2.01	Total Construction Cost (TCC)					$67,548	
2.02	Labor				25%	$67,548	
2.03	Direct and Indirect					$110,778	
2.04	Overhead and Profit				10%	$27,019	
2.05	Preliminary Engineering				2%	$5,404	
2.06	Final Design				12%	$32,423	
2.07	Project Management				7%	$18,913	
2.08	Construction Management				7%	$18,913	
2.09	Liability and Insurance				2%	$5,404	
2.10	Legal Permits, Review, Surveys				1%	$2,702	
	Total			$132,350	21%	**$448,515**	FY2020

Alternative A at Dublin/Pleasanton BART

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Stop Infrastructure**					**$424,240**	
1.1	D/P BART					**$424,240**	
1.11	Covered Waiting Area	$ 25,000.00	1	$ 25,000.00	30%	$32,500	
1.12	(A) Bus Curb Concrete		1			$91,910	
1.121	*AC and Base Removal*	*$ 3.00*	*1725*	*$ 5,175.00*	*30%*	*$6,728*	Square Feet
1.122	*Sidewalk / Concrete Removal*	*$ 5.00*	*1000*	*$ 5,000.00*	*30%*	*$6,500*	Square Feet
1.123	*Curb / Curb and Gutter Removal*	*$ 5.00*	*180*	*$ 900.00*	*30%*	*$1,170*	Linear Feet
1.124	*PCC Paving w/AB (Bus)*	*$ 25.00*	*1725*	*$ 43,125.00*	*30%*	*$56,063*	Square Feet
1.125	*PCC Paving w/AB (Sidewalk)*	*$ 10.00*	*1200*	*$ 12,000.00*	*30%*	*$15,600*	Square Feet
1.126	*Curb / Curb and Gutter w/AB*	*$ 25.00*	*180*	*$ 4,500.00*	*30%*	*$5,850*	Linear Feet
1.13	Waste bins	$ 1,000.00	2	$ 2,000.00	30%	$2,600	
1.14	Display Cases	$ 6,000.00	1	$ 6,000.00	30%	$7,800	
1.15	Lighting and Security	$ 50,000.00	1	$ 50,000.00	30%	$65,000	
1.16	Misc. Electrical	$ 87,000.00	1	$ 87,000.00	30%	$113,100	
1.17	PG&E Service	$ 15,000.00	1	$ 15,000.00		$15,000	
1.18	Security Pole	$ 3,400.00	1	$ 3,400.00	30%	$4,420	Quote from Rath Security for security pole
2.0	**Construction**					**$173,938**	
2.1	Direct and Indirect					**$173,938**	
2.11	Overhead and Profit				10%	$42,424	
2.12	Preliminary Engineering				2%	$8,485	
2.13	Final Design				12%	$50,909	
2.14	Project Management				7%	$29,697	
2.15	Construction Management				7%	$29,697	
2.16	Liability and Insurance				2%	$8,485	
2.17	Legal Permits, Review, Surveys				1%	$4,242	
	Total			$259,100	21%	**$598,178**	FY2020

Alternative B at Dublin/Pleasanton BART

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Stop Infrastructure**					**$1,368,560**	
1.1	D/P BART					**$1,368,560**	
1.11	Covered Waiting Area	$ 25,000.00	2	$ 50,000.00	30%	$65,000	
1.12	(B) Bus Islands		2			$855,140	
1.121	*AC and Base Removal*	*$ 3.00*	*12500*	*$ 37,500.00*	*30%*	$48,750	Square Feet
1.122	*Sidewalk / Concrete Removal*	*$ 5.00*	*1000*	*$ 5,000.00*	*30%*	$6,500	Square Feet
1.123	*Curb / Curb and Gutter Removal*	*$ 5.00*	*180*	*$ 900.00*	*30%*	$1,170	Linear Feet
1.124	*PCC Paving w/AB (Bus)*	*$ 25.00*	*10000*	*$ 250,000.00*	*30%*	$325,000	Square Feet
1.125	*PCC Paving w/AB (Sidewalk)*	*$ 10.00*	*3100*	*$ 31,000.00*	*30%*	$40,300	Square Feet
1.126	*Curb / Curb and Gutter w/AB*	*$ 25.00*	*180*	*$ 4,500.00*	*30%*	$5,850	Linear Feet
1.14	Rest Facility					$240,500	
1.137	*Bathrooms*	*$ 60,000.00*	*2*	*$ 120,000.00*	*30%*	$156,000	
1.138	*Water Service Connection (Bathroom)*	*$ 10,000.00*	*1*	*$ 10,000.00*	*30%*	$13,000	
1.139	*Water Service Connection (Irrigation)*	*$ 10,000.00*	*1*	*$ 10,000.00*	*30%*	$13,000	
1.140	*Sewer Connection (Bathroom)*	*$ 10,000.00*	*1*	*$ 10,000.00*	*30%*	$13,000	
1.141	*Drainage*	*$ 35,000.00*	*1*	*$ 35,000.00*	*30%*	$45,500	
1.15	Waste bins	$ 1,000.00	2	$ 2,000.00	30%	$2,600	
1.16	Display Cases	$ 6,000.00	1	$ 6,000.00	30%	$7,800	
1.17	Lighting and Security	$ 50,000.00	1	$ 50,000.00	30%	$65,000	
1.18	Misc. Electrical	$ 87,000.00	1	$ 87,000.00	30%	$113,100	
1.19	PG&E Service	$ 15,000.00	1	$ 15,000.00		$15,000	
1.20	Security Pole	$ 3,400.00	1	$ 3,400.00	30%	$4,420	
2.0	**Construction**					**$561,110**	
2.1	Direct and Indirect					**$561,110**	
2.11	Overhead and Profit				10%	$136,856	
2.12	Preliminary Engineering				2%	$27,371	
2.13	Final Design				12%	$164,227	
2.14	Project Management				7%	$95,799	
2.15	Construction Management				7%	$95,799	
2.16	Liability and Insurance				2%	$27,371	
2.17	Legal Permits, Review, Surveys				1%	$13,686	
	Total			$727,300	23%	**$1,929,670**	FY2020

Alternative C at Dublin/Pleasanton BART

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Stop Infrastructure**					**$802,800**	
1.1	D/P BART					**$802,800**	
1.11	Covered Waiting Area	$ 25,000.00	1	$ 25,000.00	30%	$32,500	
1.12	(C) Bus Curb Concrete		1			$562,380	
1.121	*AC and Base Removal*	*$ 3.00*	*14000*	*$ 42,000.00*	*30%*	*$54,600*	Square Feet
1.122	*Sidewalk / Concrete Removal*	*$ 5.00*	*1100*	*$ 5,500.00*	*30%*	*$7,150*	Square Feet
1.123	*Curb / Curb and Gutter Removal*	*$ 5.00*	*70*	*$ 350.00*	*30%*	*$455*	Linear Feet
1.124	*PCC Paving w/AB (Bus)*	*$ 25.00*	*14000*	*$ 350,000.00*	*30%*	*$455,000*	Square Feet
1.125	*PCC Paving w/AB (Sidewalk)*	*$ 10.00*	*3300*	*$ 33,000.00*	*30%*	*$42,900*	Square Feet
1.126	*Curb / Curb and Gutter w/AB*	*$ 25.00*	*70*	*$ 1,750.00*	*30%*	*$2,275*	Linear Feet
1.13	Waste bins	$ 1,000.00	2	$ 2,000.00	30%	$2,600	
1.14	Display Cases	$ 6,000.00	1	$ 6,000.00	30%	$7,800	
1.15	Lighting and Security	$ 50,000.00	1	$ 50,000.00	30%	$65,000	
1.16	Misc. Electrical	$ 87,000.00	1	$ 87,000.00	30%	$113,100	
1.17	PG&E Service	$ 15,000.00	1	$ 15,000.00		$15,000	
1.18	Security Pole	$ 3,400.00	1	$ 3,400.00	30%	$4,420	
2.0	**Construction**					**$329,148**	
2.1	Direct and Indirect					**$329,148**	
2.11	Overhead and Profit				10%	$80,280	
2.12	Preliminary Engineering				2%	$16,056	
2.13	Final Design				12%	$96,336	
2.14	Project Management				7%	$56,196	
2.15	Construction Management				7%	$56,196	
2.16	Liability and Insurance				2%	$16,056	
2.17	Legal Permits, Review, Surveys				1%	$8,028	
	Total			$621,000	21%	**$1,131,948**	FY2020

Alternative D at Dublin/Pleasanton BART

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Stop Infrastructure**					**$580,240**	
1.1	D/P BART					**$580,240**	
1.11	Covered Waiting Area	$ 25,000.00	1	$ 25,000.00	30%	$32,500	
1.12	(D) Bus Curb Concrete		1			$169,910	
1.121	*AC and Base Removal*	*$ 3.00*	*6000*	*$ 18,000.00*	*30%*	*$23,400*	Square Feet
1.122	*Sidewalk / Concrete Removal*	*$ 5.00*	*220*	*$ 1,100.00*	*30%*	*$1,430*	Square Feet
1.123	*Curb / Curb and Gutter Removal*	*$ 5.00*	*220*	*$ 1,100.00*	*30%*	*$1,430*	Linear Feet
1.124	*PCC Paving w/AB (Bus)*	*$ 25.00*	*3000*	*$ 75,000.00*	*30%*	*$97,500*	Square Feet
1.125	*PCC Paving w/AB (Sidewalk)*	*$ 10.00*	*3000*	*$ 30,000.00*	*30%*	*$39,000*	Square Feet
1.126	*Curb / Curb and Gutter w/AB*	*$ 25.00*	*220*	*$ 5,500.00*	*30%*	*$7,150*	Linear Feet
1.13	Waste bins	$ 1,000.00	2	$ 2,000.00	30%	$2,600	
1.14	Display Cases	$ 6,000.00	1	$ 6,000.00	30%	$7,800	
1.15	Lighting and Security	$ 50,000.00	1	$ 50,000.00	30%	$65,000	
1.16	Misc. Electrical	$ 87,000.00	1	$ 87,000.00	30%	$113,100	
1.17	PG&E Service	$ 15,000.00	1	$ 15,000.00		$15,000	
1.18	Security Pole	$ 3,400.00	1	$ 3,400.00	30%	$4,420	
2.0	**Construction**					**$237,898**	
2.1	Direct and Indirect					**$237,898**	
2.11	Overhead and Profit				10%	$58,024	
2.12	Preliminary Engineering				2%	$11,605	
2.13	Final Design				12%	$69,629	
2.14	Project Management				7%	$40,617	
2.15	Construction Management				7%	$40,617	
2.16	Liability and Insurance				2%	$11,605	
2.17	Legal Permits, Review, Surveys				1%	$5,802	
	Total			$319,100	21%	**$818,138**	FY2020

Alternative E at Dublin/Pleasanton BART

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Stop Infrastructure**					**$1,007,680**	
1.1	D/P BART					**$1,007,680**	
1.11	Covered Waiting Area	$ 25,000.00	1	$ 25,000.00	30%	$32,500	
1.12	(Da) Bus Curb Concrete		1			$383,630	
1.121	*AC and Base Removal*	*$ 3.00*	*7200*	*$ 21,600.00*	*30%*	*$28,080*	Square Feet
1.122	*Sidewalk / Concrete Removal*	*$ 5.00*	*1000*	*$ 5,000.00*	*30%*	*$6,500*	Square Feet
1.123	*Curb / Curb and Gutter Removal*	*$ 5.00*	*450*	*$ 2,250.00*	*30%*	*$2,925*	Linear Feet
1.124	*PCC Paving w/AB (Bus)*	*$ 25.00*	*9500*	*$ 237,500.00*	*30%*	*$308,750*	Square Feet
1.125	*PCC Paving w/AB (Sidewalk)*	*$ 10.00*	*2000*	*$ 20,000.00*	*30%*	*$26,000*	Square Feet
1.126	*Curb / Curb and Gutter w/AB*	*$ 25.00*	*350*	*$ 8,750.00*	*30%*	*$11,375*	Linear Feet
1.13	Waste bins	$ 1,000.00	2	$ 2,000.00	30%	$2,600	
1.14	Display Cases	$ 6,000.00	1	$ 6,000.00	30%	$7,800	
1.15	Lighting and Security	$ 50,000.00	1	$ 50,000.00	30%	$65,000	
1.16	Misc. Electrical	$ 87,000.00	1	$ 87,000.00	30%	$113,100	
1.17	PG&E Service	$ 15,000.00	1	$ 15,000.00		$15,000	
1.18	Security Pole	$ 3,400.00	1	$ 3,400.00	30%	$4,420	
2.0	**Construction**					**$413,149**	
2.1	Direct and Indirect					**$413,149**	
2.11	Overhead and Profit				10%	$100,768	
2.12	Preliminary Engineering				2%	$20,154	
2.13	Final Design				12%	$120,922	
2.14	Project Management				7%	$70,538	
2.15	Construction Management				7%	$70,538	
2.16	Liability and Insurance				2%	$20,154	
2.17	Legal Permits, Review, Surveys				1%	$10,077	
	Total			$483,500	21%	**$1,420,829**	FY2020

Appendix H – Conceptual Cost for Wayfinding Signage at Dublin/Pleasanton BART

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Stop Infrastructure**					**$37,700**	
1.1	Digital Signage	$ 3,500	6	$ 21,000	30%	$27,300	5 default new signs, 1 sign at new bay
1.2	Broadband	$ 8,000	1	$ 8,000	30%	$10,400	
2.0	**Construction**					**$15,457**	
2.1	Direct and Indirect					**$15,457**	
2.11	Overhead and Profit				10%	$3,770	
2.12	Preliminary Engineering				2%	$754	
2.13	Final Design				12%	$4,524	
2.14	Project Management				7%	$2,639	
2.15	Construction Management				7%	$2,639	
2.16	Liability and Insurance				2%	$754	
2.17	Legal Permits, Review, Surveys				1%	$377	
	Total					$53,157	FY2020

Appendix I – Conceptual Cost Estimate for Bicycle and Scooter Improvements at Dublin/Pleasanton BART

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Stop Infrastructure**					**$19,500**	
1.1	Bike Lockers	$ 1,500	10	$ 15,000	30%	$19,500	
1.2	Scooter Improvements	$ -	0	$ -	0%	$0	No up-front costs
2.0	**Construction**					**$7,995**	
2.1	Overhead and Profit				10%	$1,950	
2.2	Preliminary Engineering				2%	$390	
2.3	Final Design				12%	$2,340	
2.4	Project Management				7%	$1,365	
2.5	Construction Management				7%	$1,365	
2.6	Liability and Insurance				2%	$390	
2.7	Legal Permits, Review, Surveys				1%	$195	
	Total					$27,495	FY2020

Appendix J – Conceptual Cost Estimate for Sidewalk Covers at Dublin/Pleasanton BART

Item	Description	Unit Cost	Quantity	Based Total	Contingency	Total Amount	Comment
1.0	**Stop Infrastructure**					**$325,000**	2020 YOE
1.1	Canopy Structure (Pedestrian)	$ 15.00	5,000	$ 75,000.00	30%	$97,500	Square Feet
1.2	Canopy Structure (Iron Horse Trail)	$ 15.00	11,000	$ 165,000.00	30%	$214,500	Square Feet
1.3	Lighting	$ 10,000.00	1	$ 10,000.00	30%	$13,000	
2.0	**Construction**					**$133,250**	2020 YOE
2.1	Overhead and Profit				10%	$32,500	
2.2	Preliminary Engineering				2%	$6,500	
2.3	Final Design				12%	$39,000	
2.4	Project Management				7%	$22,750	
2.5	Construction Management				7%	$22,750	
2.6	Liability and Insurance				2%	$6,500	
2.7	Legal Permits, Review, Surveys				1%	$3,250	
	Total			$250,000	13%	**$458,250**	FY2020