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Planning for Tomorrow's Transportation



Central County Action Plan

Proposal for Adoption | March 2023







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Member Jurisdictions:



Central County Action Plan

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This Action Plan is a culmination of work between many jurisdiction and agency representatives as listed herein. This list is not exhaustive of all partner agencies that assisted in formulating this plan in one form or another.¹

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Central County Action Plan

Table of Contents

Abbreviations	vii
Chapter 1: Introduction	1
Measure J Transportation and Growth Management Program	1
Action Plan Purpose	3
Action Plan Contents	4
Relationship of this Action Plan to the Countywide Transportation Plan	5
Public Engagement for the Action Plan	5
Definition of Terms	7
Regional Transportation Objectives	8
Chapter 2: Current Conditions, Trends, and Travel Patterns	11
Travel Demand Modeling	11
COVID-19 Effects	12
Population and Employment	14
Commute Patterns and Travel Demand Forecasts	16
Modeled Mode Share	17
Transit	21
Active Transportation	22
Roadways	22
Safety	23
Equity	24
Climate Change and GHG Trends and Forecasts	24
Innovation and Technology	25
Housing Development	25
Conclusion: Moving Toward a Multimodal Network	25
Chapter 3: Vision, Goals, and Policies	27
Vision	27
Goals	28
Policies	29
Chapter 4: Routes of Regional Significance	31
Chapter 5: Transit	37
RTOs	41
Actions	48
Chapter 6: Active Transportation	51
RTOs	55
Actions	61

Chapter 7: Roadways	65
Freeway RTOs	68
Surface Roadway RTOs	70
Actions	73
Chapter 8: Safety	75
RTOs	76
Actions	80
Chapter 9: Equity	81
RTOs	82
Actions	93
Chapter 10: Climate Change	95
RTOs	96
Actions	100
Chapter 11: Innovation and Technology	101
RTOs	102
Actions	103
Chapter 12: Financial Outlook	105
TRANSPAC Subregional Transportation Mitigation Program (STMP)	106
Actions	106
Shared Facilities	106
Chapter 13: Procedures for Notification, Review, and Monitoring	107
Role of Regional Transportation Planning Committees	107
Circulation of Environmental Documents and Transportation Impact Studies	108
Review of General Plan Amendments	109
Schedule for Action Plan Review	110
Regional Traffic Management	110
Implications for Compliance with the Measure J Growth Management Program	111
Process for Addressing RTO Exceedances	111
Appendix A: Summary of RTOs and Targets	115
Appendix B: RTOs Considered but not Recommended for Adoption in this Action Plan	121
Appendix C: Summary of Actions	125
Appendix D: Transportation Modeling Results	147
Appendix E: RTO Measurement and Modeling Methodologies	153

Tables

Table 2-1: Means of Transportation to Work in Contra Costa County and the Central County Subregion (2019).....	18
Table 2-2: Modeled Home-to-Work Mode Share: Central County Residents.....	19
Table 2-3: Modeled Home-to-Work Mode Share: Jobs in Central County	20
Table 2-4: Mode Share for All Trips: Central County Subregion Residents	20
Table 5-1: Summary of Transit Regional Transportation Objectives	38
Table 5-2: Mode Used to Access Central County BART Stations (2015)	42
Table 5-3: Travel Time Ratio for Autos vs Transit on Key Corridors	43
Table 5-4: Proportion of Urbanized Land in Central County with Access to High-Quality Transit	44
Table 5-5: Number of Calendar Year 2019 Rides Provided by Central County Paratransit and Community-Based Transportation Providers	47
Table 6-1: Summary of Active Transportation Regional Transportation Objectives	52
Table 6-2: Proportion of Central County LSBN Completed (2022).....	56
Table 7-1: Summary of Roadway Regional Transportation Objectives	66
Table 7-2: Observed and Baseline Modeled Conditions: Freeways.....	70
Table 7-3: Intersection LOS Definitions.....	71
Table 7-4: LOS for Two-Lane Roadways	72
Table 7-5: Corridor LOS for Two-Way Roadways Outside Urban Areas	72
Table 8-1: Summary of Safety Regional Transportation Objectives.....	76
Table 8-2: KSI Collisions by Type: Central County Subregion, January 1, 2016, through December 31, 2019.....	79
Table 8-3: Active Transportation Collisions by Severity: Central County Subregion, January 1, 2016, through December 31, 2019.....	79
Table 9-1: Summary of Equity Regional Transportation Objectives	82
Table 9-2: Proportion of the Central County LSBN That Is Complete in EPCs	83
Table 9-3: KSI and Active Transportation-Involved Collision Rates	87
Table 9-4: Average Auto-Accessible Jobs per Capita (30-Minute Drive)	88
Table 9-5: Average Transit Accessible Jobs per Capita (45-Minute Ride).....	88
Table 9-6: Central County EPC Acres in Relation to High-Quality Transit	89
Table 10-1: Summary of Climate Change Regional Transportation Objectives	96
Table 10-2: VMT per Service Population.....	97
Table 10-3: Average Daily Transportation-Related GHG per Capita	98
Table 10-4: Electric Vehicles by Subregion as of April 2021	99
Table 11-1: Summary of Innovation and Technology Regional Transportation Objective.....	102
Table A-1: Summary RTOs and Targets	115
Table C-1: Summary of Action and Applicable Detail	126

Table D-1: RTO Monitoring Location Peak-Hour LOS	147
Table D-1. Corridors for Transit-Auto Travel Time Comparison	157
Table D-2. Freeway Facilities and Previous Performance Targets	161
Table D-3. Intersection LOS Definitions	164
Table D-4. Signalized Intersection Level of Service: Previous Action Plans	165
Table D-5. Signalized Intersections and Available Intersection Data	167
Table D-6. Two-Lane Non-Urban Roadway Corridors	174
Table D-7. LOS for Two-Lane Non-urban Roadways	175

Figures

Figure 2-1: Contra Costa County Demographic Growth	14
Figure 2-2: Subregional Population Growth	15
Figure 2-3: Subregional Job Growth	15
Figure 2-4: Subregional Employed Residents	16
Figure 2-5: Mode Share of All Trips by Subregion (2019)	17
Figure 4-1: Central County Multimodal Corridor Map	35
Figure 5-1: Important Transit Routes in Central County	39
Figure 5-2: Central County High-Quality Transit	45
Figure 6-1: Central County Low-Stress Bicycle Network	53
Figure 6-2: Status of Crossings at Intersections of the LSBN and Heavily Traveled Roadways	59
Figure 7-1: Map of LOS Monitoring Locations and Segments	67
Figure 8-1: KSI and Active Transportation-Involved Collisions (2016-2019)	78
Figure 9-1: Central County Low-Stress Bicycle Network in EPCs	85
Figure 9-2: Central County EPCs and High-Quality Transit	91
Figure D-1. Freeway Facilities	162
Figure D-2. Arterial Intersections and Roadway RRS (West County)	168
Figure D-3. Arterial Intersections and Roadway RRS (Central County)	169
Figure D-4. Arterial Intersections and Roadway RRS (East County)	170
Figure D-5. Arterial Intersections and Roadway RRS (Southwest County – Lamorinda)	171
Figure D-6. Arterial Intersections and Roadway RRS (Southwest County – Tri-Valley)	172

Abbreviations

ADA	Americans with Disability Act
BART	Bay Area Rapid Transit
CBPP	Countywide Bicycle and Pedestrian Plan
CCTA	Contra Costa Transportation Authority
CEQA	California Environmental Quality Act
CMP	Congestion Management Plan
CO ₂	carbon dioxide
CTC	County Transportation Commission
CTP	Countywide Transportation Plan
DPMT	dynamic personal micro transit
EB	eastbound
EBRPD	East Bay Regional Parks District
EIR	Environmental Impact Report
EPC	Equity Priority Communities
EV	electric vehicle
GHG	greenhouse gas
GMP	Growth Management Program
GPA	General Plan Amendment
HOV	high occupancy vehicle
HOT	high occupancy toll
I-	Interstate
ICM	Integrated Corridor Management
ITS	Intelligent Transportation System
KSI	Killed or Severely Injured
LOS	Level of Service
LSBN	Low Stress Bicycle Network
MPH	miles per hour

MTC	Metropolitan Transportation Commission
MTSO	Multimodal Transportation Service Objectives
NNPHVT	Net New Peak-Hour Vehicle Trip
NOC	Notice of Completion
NOP	Notice of Preparation
OBAG	One Bay Area Grant
PBT	Pedestrian-Bicycle-Transit
PCI	Pavement Condition Index
PDA	Priority Development Area
RFP	request for proposal
RRS	Routes of Regional Significance
RTOS	Regional Transportation Objectives
RTMP	Regional Transportation Mitigation Program
RTPC	Regional Transportation Planning Committee SB Senate Bill
SOV	Single-Occupant Vehicle
SR-	State Route
STMP	Subregional Transportation Mitigation Program
TAC	Technical Advisory Committee
TDM	Transportation Demand Management
TEP	Transportation Expenditure Plan
TIMS	Transportation Injury Mapping System
TLC	Transportation for Livable Communities
TRANSPAC	Transportation Partnership and Cooperation
TSM	Transportation Systems Management
ULL	Urban Limit Line
VMT	vehicle miles traveled
WB	westbound
ZEV	zero-emission vehicles

Central County Action Plan



Chapter 1: Introduction

This document is the Action Plan covering the incorporated and unincorporated communities throughout the Central County subregion of Contra Costa County, prepared in compliance with the voter-approved Measure J Growth Management Program (GMP) of the Contra Costa Transportation Authority (CCTA). This chapter provides background information about CCTA, Measure J, the GMP, and this Action Plan.

Measure J Transportation and Growth Management Program

In November 2004, Contra Costa voters approved the renewal of the original 1988 Measure C Transportation Improvement and GMP — a half-cent sales tax to fund transportation projects and programs—with a new ballot measure called Measure J. Measure J, which began expenditure implementation in April 2009, is anticipated to generate approximately \$2 billion (in 2008 dollars) over a 25-year period through 2034.

Measure J continues Contra Costa's innovative GMP that was originally adopted with Measure C, which voters approved in 1988. The goals of the GMP are as follows:

- Ensure that new residential, business, and commercial growth pays for the facilities required to meet the demands resulting from that growth.
- Require cooperative transportation and land use planning among local jurisdictions.
- Support land use patterns in Contra Costa County that make more efficient use of the transportation system, consistent with the general plans of local jurisdictions.
- Support infill and redevelopment in existing urban and brownfield areas.

To receive its formulaic share of 18 percent return to source local street maintenance and improvement funds and to become eligible for competitive Transportation for Livable Communities (TLC) funds, a local jurisdiction must comply with the GMP, which requires the following activities:²

- **Adopt a Growth Management Element** as part of its general plan that outlines how the jurisdiction will comply with the other requirements in this list.
- **Adopt a local and regional Development Mitigation Program** that ensures new growth or remodel and reuse projects pay for their share of the costs associated with that growth.
- **Participate in an ongoing, cooperative, multi-jurisdictional planning process** with other jurisdictions and agencies in Contra Costa to create a balanced, safe, and efficient transportation system and to manage the impacts of growth.
- **Address housing options** and demonstrate reasonable progress in providing housing options for people of all income levels in a report on the implementation of actions outlined in the adopted housing element.
- **Develop a five-year Capital Improvement Program** outlining the capital projects needed to meet the goals of the local jurisdiction's general plan.
- **Adopt a Transportation Systems Management (TSM) Ordinance or Resolution** conforming to CCTA's model TSM Ordinance or Resolution and promotes carpools, vanpools, and park and ride lots.
- **Adopt a voter-approved Urban Limit Line (ULL)** complying with the countywide, voter-approved ULL or the local jurisdiction's voter-approved ULL.

Among these elements, preparing an Action Plan at the subregional level is included under the requirement to "Participate in an Ongoing, Cooperative, Multi-jurisdictional Planning Process." The specific requirements of this element, as defined in Measure J, are as follows:

² The Contra Costa TLC Program funds transportation projects in communities to facilitate, support, and/or catalyze affordable housing, transit-oriented or mixed-use development, and encourage traffic-calming and the use of non-vehicular modes of transportation to minimize single-occupancy vehicle trips and make Contra Costa's communities more pedestrian-, bicycle-, and transit-friendly.

Each jurisdiction shall participate in an ongoing process with other jurisdictions and agencies, the Regional Transportation Planning Committees (RTPCs) and the Authority to create a balanced, safe, and efficient transportation system and to manage the impacts of growth. Jurisdictions shall work with the RTPCs to:

- Identify Routes of Regional Significance (RRS) and establish Regional Transportation Objectives (RTOs)³ for those routes and actions associated with achieving those objectives.
- Apply the Authority's travel demand model and technical procedures to the analysis of General Plan Amendments (GPAs) and developments exceeding specified thresholds for their effect on the regional transportation system, including on Action Plan objectives.
- Create a development mitigation program.
- Assist with development of other plans, programs, and studies to address other transportation and growth management issues.

In consultation with the RTPCs, each jurisdiction shall use the travel demand model to evaluate changes to local General Plans and the impacts of major development projects for their effects on the local and regional transportation system and the ability to achieve the RTOs established in the Action Plans.

Jurisdictions shall also participate in the Authority's ongoing countywide transportation planning process. As part of this process, the Authority shall support countywide and subregional planning efforts, including the Action Plans for RRS, and shall maintain a travel demand model. Jurisdictions shall help maintain the Authority's travel demand modeling system by providing information on proposed improvements to the transportation system and planned and approved development within the jurisdiction."⁴

A separate Action Plan is prepared and adopted for each of the five subregions in Contra Costa. The Central County subregion, which is the subject of this Action Plan, encompasses the incorporated jurisdictions of Martinez, Concord, Pleasant Hill, Clayton, and Walnut Creek as well as unincorporated portions of central Contra Costa County.

CCTA is responsible for leading the development of and accepting the locally adopted Action Plans created in each subregion for inclusion in the Countywide Transportation Plan (CTP), and for evaluating whether each jurisdiction fully complies with the GMP.

Action Plan Purpose

The purpose of the Action Plan is for each local jurisdiction in Contra Costa to participate in the multijurisdictional, cooperative planning process envisioned in Measure J to address regional transportation issues that span jurisdictional boundaries. The basic framework for this process is

³ As discussed later in this Action Plan, the previously named Multimodal Transportation Service Objectives (MTSOs) have been renamed as Regional Transportation Objectives (RTOs).

⁴ Measure J: Contra Costa's Transportation Sales Tax Expenditure Plan, Contra Costa Transportation Authority, July 21, 2004, pp. 24–25.

established through the Regional Transportation Planning Committees (RTPCs), which are defined in Measure J. The Transportation Partnership and Cooperation (TRANSPAC) committee is the Authority-designated RTPC for Central County. The Action Plans are intended to establish overall goals, identify RRS, create a set of performance measures (now called Regional Transportation Objectives, or RTOs), and establish a set of actions that will support achievement of the RTOs.

Action Plans are required by Measure J to be prepared by the RTPC for each subregion of Contra Costa County (West; Central; East; Lamorinda; and the Tri-Valley, which includes a portion of Alameda County). CCTA is responsible for funding this effort and for coordinating and coalescing the individual Action Plans from each RTPC together to form the foundation of the CTP.

The Actions in this Action Plan are needed to achieve the RTO targets and to implement other goals and policies of this Action Plan, the CTP, and other regional long-range planning documents with shared priorities. For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion's incorporated cities and the unincorporated portion of central Contra Costa County. All Actions are enumerated in a summary table in Appendix C, which also lists the responsible agency, partner agencies, and proposed timeline for each Action.

Action Plan Contents

The Central County Action Plan contains the following components:

- **Introduction (Chapter 1)**, which outlines the Measure J GMP and the purpose of this document.
- **Current Conditions, Trends, and Travel Patterns (Chapter 2)**, which looks at long-range land use and population changes and their anticipated impact to the transportation system.
- **Vision, Goals, and Policies (Chapter 3)** describes the overall vision, goals, and policies of the Action Plan.
- **Routes of Regional Significance (Chapter 4)** maps and describes the multimodal corridors that make up the RRS in Central County.
- **Transit (Chapter 5)** identifies the RTOs and Actions related to transit service.
- **Active Transportation (Chapter 6)** identifies the RTOs and Actions related to active transportation.
- **Roadways (Chapter 7)** identifies the RTOs and Actions related to roadways.
- **Safety (Chapter 8)** identifies the RTOs and Actions related to transportation safety.
- **Equity (Chapter 9)** identifies the RTOs and Actions related to transportation equity.
- **Climate Change (Chapter 10)** identifies the RTOs and Actions related to climate change and transportation.
- **Innovation and Technology (Chapter 11)** identifies the RTOs and Actions related to innovation and new technology.

- **Financial Outlook (Chapter 12)** includes funding and multijurisdictional planning information.
- **Procedures for Notification, Review, and Monitoring (Chapter 13)** includes project notification procedures and the process for general plan review.

Chapters 5 to 11 include the RTOs for each mode or topic, and a list of Actions that are needed to achieve the RTO targets and to implement other goals and policies of this Plan. A consolidated list of actions for all chapter topics in this Action Plan can be found in Appendix C.

Relationship of this Action Plan to the Countywide Transportation Plan

This update of the Central County Action Plan has been prepared concurrently with, and in conjunction with, updates to the other four subregional Action Plans. This Action Plan update uses a comprehensive update approach that ensures the critical components of each Action Plan will be similar to one another, with modifications as needed due to the unique needs of Central County and the other subregions. All five Action Plans determine the policies and actions that the Authority can adopt into the 2023 CTP Update. The Authority will incorporate the Policies and Actions from all five Action Plans provided that consensus has been achieved among the affected jurisdictions and RTPCs.

Public Engagement for the Action Plan

Extensive public outreach was conducted with the Contra Costa County community as part of the Action Plan update process. Both in-person and on-line outreach occurred during March and April 2022. Outreach events in Central County included two in-person pop-up events, one virtual workshop, and an online community survey. At each outreach event and the online community survey, participants were asked three questions:

- What do you think transportation should look like in the future?
- What can we do to help you with your transportation needs?
- What is your bright idea for improving transportation in the county?

Of the 704 comments received during this public outreach effort, 20 percent of the responses were specific to the Central County subregion, and the remainder were either general to the county as a whole or applicable to one of the other four subregions. Feedback regarding the Central County subregion focused on transit improvements, active transportation sidewalk and inter-city access, traffic-calming techniques, and equity in the transportation system. Specific comments included:

- Address active and public transportation barriers for those with mobility needs, including Americans with Disability Act (ADA) accessible bicycle and pedestrian facilities, taxi service with wheelchair access, and extended service hours.
- Increase traffic-calming techniques along busy roadways.

- ▣ Provide safe bicycle and pedestrian connections across the subregion, particularly when at roadway and train track crossings.
- ▣ Provide continuous sidewalks and bicycle lanes and install lighting for safe travel in the dark.
- ▣ Provide protected bicycle lanes to schools.
- ▣ Improve traffic light cycles and remove unprotected left turns.
- ▣ Reduce neighborhood cut-through traffic.
- ▣ Connect trail networks to transit hubs.
- ▣ Encourage public transit ridership again.

Input received from this outreach effort provided CCTA, its consultants, and Central County jurisdictions additional feedback to understand community priorities for consideration in the Action Plan update and the update of the CTP.

Definition of Terms

This Action Plan uses several terms to describe specific components of the Action Plan. These terms and their definitions are as follows.

- **Goal:** A statement that describes, in general terms, a condition or quality of service desired.
- **Policy:** A statement that guides action and overall direction. Decisions regarding investments, program development, and development approvals are based on these policies.
- **Route of Regional Significance (RRS):** RRS are roadways, publicly accessible transit facilities, and active transportation facilities that connect two or more subareas of Contra Costa; cross county boundaries; carry significant through traffic; and/or provide access to a regional center, a regional highway, or a transit facility. They are also routes for which entities in the subregion want to share regional responsibility with neighboring jurisdictions. RRS provide vital connections that support economic and recreational activities throughout the county.
- **Regional Transportation Objective (RTO):** RTOs are specific, quantifiable objectives that describe a desired level of performance for a component of the transportation system. They were referred to as Multimodal Transportation Service Objectives (MTSOs) in Measure J; however, for this Action Plan update, they have been rebranded to reflect the broader, more comprehensive approach to incorporating not only all travel modes and the facilities required to serve them, but also safety, equity, climate change, and innovation and technology. RTOs consist of a quantifiable measure of effectiveness (a “metric” or “standard”) and include a target date for attaining the objective. More information on RTOs is at the end of this chapter.
- **Metric:** The unit by which an RTO is measured, such as “level of service,” “delay index,” or “vehicle miles traveled per capita.”
- **Standard:** The level or increment of a metric that is required by an RTO. For example, the standard for level of service might be ‘D’, and the standard for vehicle miles traveled (VMT) per capita might be “20 miles per person per day.”
- **Action:** Actions are the specific programs or projects that are recommended for implementation to meet the RTOs in the Action Plan. The responsibility of implementing the actions may fall to an individual local jurisdiction, to the RTPC as a whole, to CCTA, or to another agency such as Caltrans or Bay Area Rapid Transit (BART). Actions are either “projects” or “programs” (defined herein).



- **Project:** Projects are actions that involve the development, structural modification, or redevelopment of infrastructure, commercial uses, industrial uses, residential uses, or other properties. Projects may include clearing or land grading, improvements to existing structures, construction activities, and other activities requiring physical construction.
- **Program:** Programs are actions that do not involve construction but instead involve education, research, funding, or other non-construction activities. Similar to projects, programs are carried out in response to an adopted policy to help achieve a specific goal or objective.

Regional Transportation Objectives

Historically, Action Plans have included MTSOs to express the quantifiable objectives that the RTPCs would use to track progress. Although the MTSOs were by nature multimodal, they neither captured nor addressed new transportation imperatives that have recently come to the forefront. These imperatives include safety, equity, climate change, and innovation and technology. This Action Plan update carries forward the previously adopted MTSOs and rebrands them as Regional Transportation Objectives (RTOs). The transition to RTOs casts a wider net to capture the new transportation imperatives of the twenty-first century.

CCTA's GMP *Implementation Guide* defines the areas of consideration that should be addressed in Action Plans, but also gives the RTPCs significant flexibility in choosing RTOs for their Action Plan. As long as the objective is quantifiable and includes a time frame for achievement of the objective, it can be proposed for inclusion in the Action Plan. Selection of the RTOs was based in part on whether the objective could be easily measured through observation and/or forecast through use of the Countywide Travel Demand Model.

There are a total of 26 RTOs identified in this Action Plan. These RTOs are summarized in tables and described in detail in Chapters 5 through 11. For a complete list of RTOs and their targets, refer to Appendix A, Summary of RTOs and Targets. Refer to Appendix B to see objectives that were considered but not recommended for adoption in this Action Plan.

- **Transit RTO-1: Transit Mode Share.** Increase the mode share of transit trips in the subregion.
- **Transit RTO-2: Mode Share to/from BART.** Increase the number of riders who access BART using means other than automobiles, including transit and active transportation.
- **Transit RTO-3: Transit Trip Time.** Optimize peak-hour and peak-direction travel time for transit as compared to automobile travel time for the same trip.
- **Transit RTO-4: High Quality Transit Access.** Increase the proportion of urbanized land area in the subregion served by high quality transit.
- **Transit RTO-5: Paratransit and Community-Based Transportation Program Access.** Increase the number of rides by paratransit and community-based transportation programs.
- **Active Transportation RTO-1: Increase Active Transportation Mode Share.** Increase the mode share of active transportation in the subregion.
- **Active Transportation RTO-2: Low-Stress Bicycle Network.** Increase the proportion of the countywide low stress bicycle network completed in the subregion.

- **Active Transportation RTO-3: Unprotected Trail Crossings.** Eliminate the number of locations where the low-stress bicycle network has an unprotected crossing of a heavily traveled vehicle route.
- **Roadways RTO-1: Freeway Delay Index.** Maintain peak-hour delay index on select freeway segments.
- **Roadways RTO-2: Freeway Buffer Index.** Maintain peak-hour freeway segment buffer index on select freeway segments.
- **Roadways RTO-3: Intersection Level of Service (LOS).** Maintain peak-hour LOS at RTO monitoring locations in urban areas.
- **Roadways RTO-4: Roadway Segment LOS.** Maintain peak-hour segment LOS on selected two-lane roadways outside of urban areas.
- **Safety RTO-1: Killed or Severely Injured Collisions.** Eliminate killed or severely injured (KSI) collisions in the subregion.
- **Safety RTO-2: Active Transportation Collisions.** Eliminate collisions in the subregion that involve users of active transportation.
- **Safety RTO-3: Active Transportation Collisions Near Schools.** Eliminate active transportation collisions within 500 feet of a school.
- **Equity RTO-1: Equity Priority Community Low-Stress Bicycle Network Completion.** Ensure that the proportion of the countywide low-stress bicycle network (LSBN) that has been completed in equity priority communities (EPCs) is equal to or greater than the proportion completed in the subregion as a whole.
- **Equity RTO-2: Collisions in EPCs.** Ensure that the proportion of KSI and active transportation-involved collisions in EPCs in the subregion is equal to or less than the proportion of the subregion's population living in EPCs.
- **Equity RTO-3: EPC Job Access: Driving.** Ensure that the number of jobs that can be reached by EPC residents with a 30-minute drive is equal to or greater than the number of jobs that can be reached with a 30-minute drive by all residents in the subregion.
- **Equity RTO-4: EPC Job Access: Transit.** Ensure that the number of jobs that can be reached by EPC residents with a 45-minute transit trip is equal to or greater than the number of jobs that can be reached with a 45-minute transit trip by all residents in the subregion.



- ▣ **Equity RTO-5: EPC Access to High-Quality Transit.** Ensure that the proportion of urbanized EPC land area in the subregion served by high-quality transit is equal to or greater than the urbanized land area served by high-quality transit in the subregion as a whole.
- ▣ **Climate Change RTO-1: Single-Occupant Vehicle (SOV) Mode Share.** Reduce the mode share of SOVs in the subregion.
- ▣ **Climate Change RTO-2: Carpool Mode Share.** Increase the mode share of carpooling in the subregion.
- ▣ **Climate Change RTO-3: Vehicle Miles Traveled.** Reduce VMT per service population in the subregion.
- ▣ **Climate Change RTO-4: Greenhouse Gas Emissions.** Reduce transportation greenhouse gas (GHG) emissions per capita in the subregion.
- ▣ **Climate Change RTO-5: Zero-Emission Vehicles.** Increase the share of zero-emission vehicles (ZEV) in the subregion.
- ▣ **Technology and Innovation RTO-1: Signal Interconnection Project.** Complete the project to upgrade traffic signals to regional ethernet and/or fiberoptic interconnection.

Central County Action Plan

Chapter 2: Current Conditions, Trends, and Travel Patterns



This chapter documents existing transportation conditions in Central County; these conditions are the basis for formulation of this Action Plan and include description of baseline and projected transportation conditions for Central County and the entire county. This information helps CCTA and the subregion to understand patterns in the transportation system and to make informed decisions on how to improve the system over time.

Travel Demand Modeling

Forecasts of future population and employment growth in Central County, as well as projections of future travel demand on major Central County transportation facilities, are drawn from the most recent available regional Travel Demand Model maintained by the Authority. This four-step, trip-based model

was most recently revalidated to a 2019 base year. The version of the CCTA model applied for this analysis accommodates a 2050 horizon year and incorporates enhanced traffic assignment procedures for freeway express lanes.

For this Action Plan update, land use inputs for the horizon year of 2050 were based on the Metropolitan Transportation Commission's (MTC's) Plan Bay Area's 2050 projections for Contra Costa County and Alameda County's portion of the Tri-Valley area. The transportation network assumptions for the Baseline 2050 scenario are derived from the latest CCTA Transportation Expenditure Plan (TEP) No Build scenario, to reflect only already-programmed improvements. In addition to the TEP projects, some additional express lanes are assumed on Interstate (I-) 680, and the extension of BART service to Livermore was removed.

COVID-19 Effects

The Action Plan update process began in the summer of 2021, amid the COVID-19 pandemic. Although COVID-19 cases peaked nearly two years ago, from November 2020 to February 2021, COVID-19 impacts have been consistently present since March 2020. Specifically, shelter-in-place orders implemented by the Contra Costa County Health Officer and the State of California in March 2020 changed travel behavior significantly throughout the county and beyond. Commuters who were able to work remotely began to do so, recreational trips diminished, and our roadways were empty. As the pandemic slowed and mandates shifted, travel demand returned, but it is different than it was. These shifts in travel demand are important to acknowledge in the Action Plan update due to the uncertainties that the pandemic has produced.

Blue Ribbon Transit Recovery Task Force

The Blue Ribbon Transit Recovery Task Force is a 32-member group created to assist MTC to further understand the scale of the COVID-19 crisis and how it impacts the transit systems in the Bay Area. The task force helped develop Bay Area Transit Transformation Action Plan to reshape the region's transit system into a more connected, efficient, and user-focused mobility network across the entire Bay Area.

In September 2020, CCTA studied various effects on travel behavior resulting from COVID-19.⁵ This study was intended to develop near-term mitigation measures to address post-COVID-19 impacts on anticipated traffic congestion in Contra Costa County. The study looked at data from March 2020 through June 2020 and showed that vehicle traffic volumes recovered after an initial decline and that transit ridership declined and remains low. CCTA also analyzed vehicle occupancy, unemployment, remote work rates, and BART data to predict traffic changes in the county. CCTA's analysis concluded that with an expected increase in the employment rate and a decrease in remote work, traffic volumes along Contra Costa corridors during peak conditions are expected to be higher than prior to COVID-19. The region should continue to track traffic trends to figure out what types of investments could address future changes.

⁵ CCTA, Impacts of COVID-19 on the Contra Costa Transportation System, September 2020.

The 2020 CCTA COVID-19 report found that about 35 percent of employees in Contra Costa County were working remotely at the peak of the pandemic. That portion is expected to decrease to 25 percent (with no mitigation) to maintain remote work, or 30 percent with mitigation. As the effects of post-COVID-19 travel behavior evolves, it is unclear if remote work will remain as prevalent, in part dependent on whether employers update current remote work policies.

Despite an initial decrease in vehicle traffic in 2020, Contra Costa County traffic volumes exceeded pre-pandemic levels by four percent as of July 2021. However, not all of the renewed traffic is for work purposes, as people have spread out the times during which they drive, including midday and weekends. In addition, the total number of collisions dropped in Contra Costa County, but fatalities have increased. The trend in increased fatalities is occurring throughout the United States and is not a phenomenon specific to Contra Costa County.



CCTA's COVID-19 report shows that transit ridership experienced a serious decline, with BART, County Connection, and Tri-Delta losing high proportions of riders in the county. BART reduced service and hours from March 2020 until early 2022, including a 9:00 pm closing time for the first seven months of 2021. By February 2022, BART restored service hours to pre-COVID levels. According to BART's Monthly Ridership Report,⁶ as of July 2022, although ridership is recovering, average weekday ridership is only 32 percent of pre-COVID levels. Some bus service in the Bay Area, especially AC Transit, showed a faster recovery than rail. The

CCTA report concludes that even if the increase of people working from home is higher than pre-COVID conditions, overall congestion is likely to increase if transit ridership continues to be less than the pre-COVID levels.

One outcome of the pandemic is higher demand for bicycle and pedestrian facilities, public spaces for outdoor activities, and car-free streets. Regional residents have a newfound appreciation for the outdoors with an increase in visits to public parks. Cities across the country, including those in the Bay Area, have embraced car-free, or slow, streets. Berkeley, for example, closed north Telegraph Avenue to cars indefinitely in June 2022. In addition, businesses expanded parklets and patios to limit exposure to COVID-19 and have consequently changed how many public rights-of-way now operate.

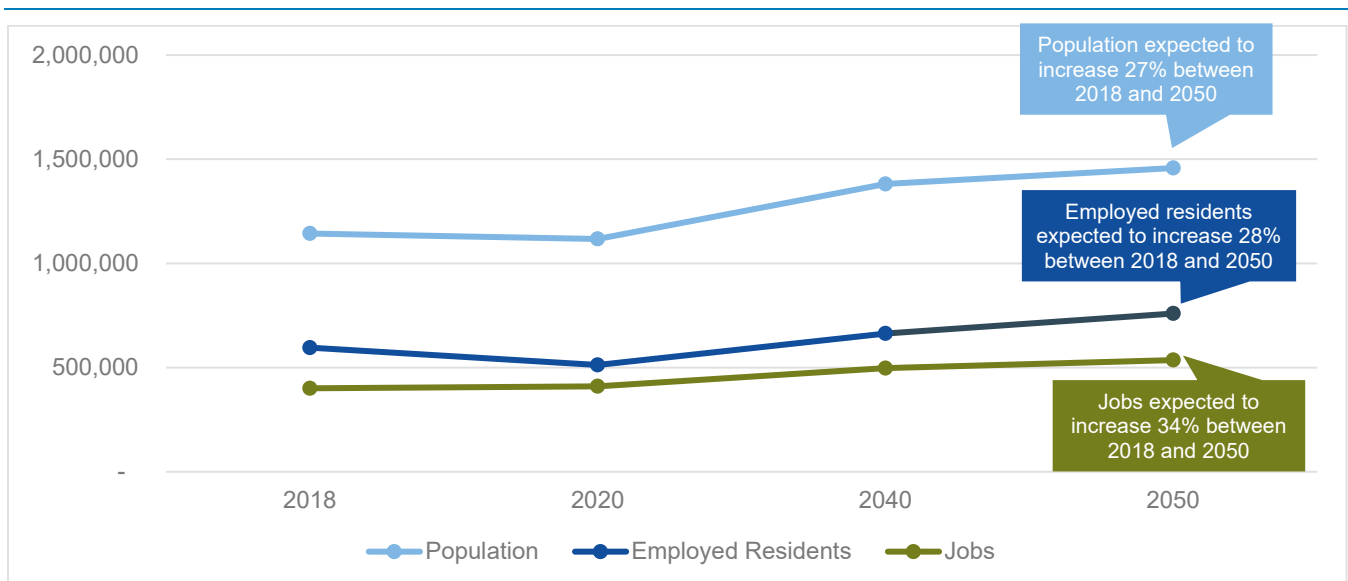
⁶ BART, Monthly Ridership Report, July 2022, <https://www.bart.gov/sites/default/files/docs/202207%20MRR.pdf>.

Due to the impact of COVID-19 on the transportation system, the Action Plan update process relies on pre-pandemic data for all traffic modeling in the CCTA Travel Demand Model. CCTA uses 2019 as the Action Plan base year, and used 2020, 2040, and 2050 population and employment data to interpolate and forecast for future years. A base year of 2019 was used because the impacts of the COVID-19 pandemic could skew analysis results due to constant fluctuations in travel behavior. While the direct impacts of the COVID-19 pandemic are not reflected in the Action Plan, CCTA hopes that the next update of the Action Plan is able to account for the “new normal” of travel behavior once a consistent behavior emerges in the coming years.

Population and Employment

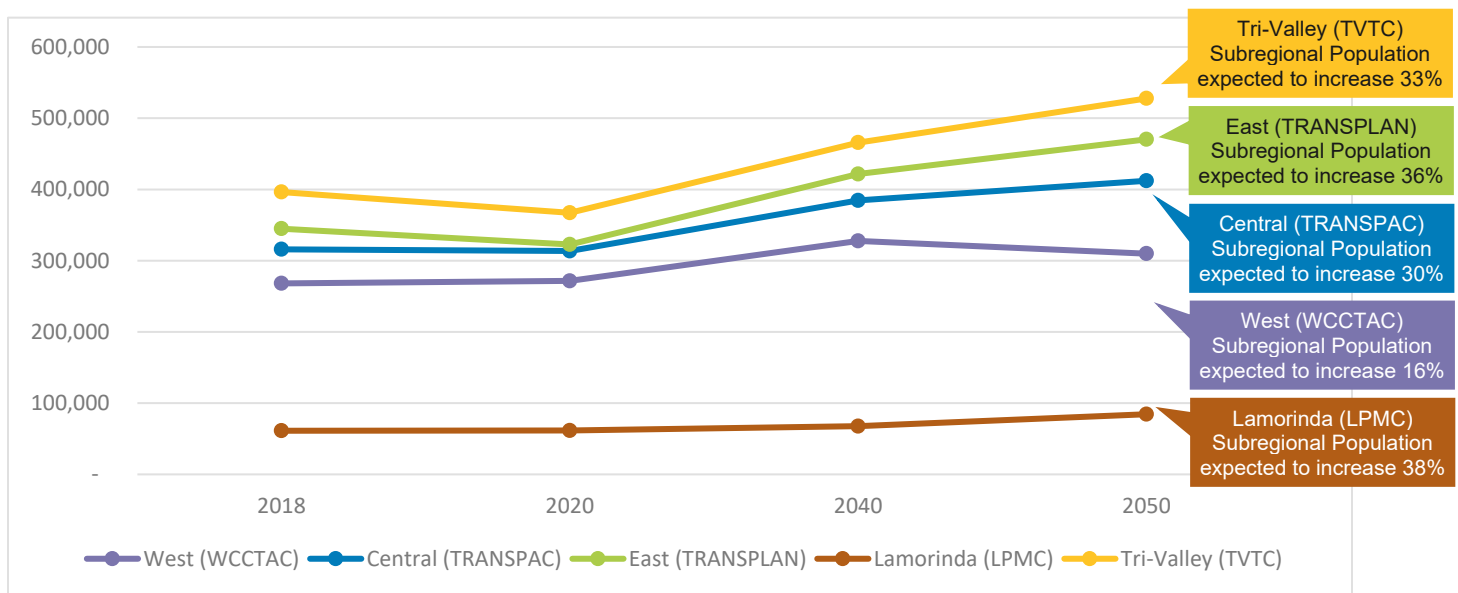
Countywide forecasts for population, employed residents, and jobs are shown in Figure 2-1, which shows a downward trend of population and employed residents occurred between 2018 and 2020 due to the COVID-19 pandemic.

Figure 2-1: Contra Costa County Demographic Growth



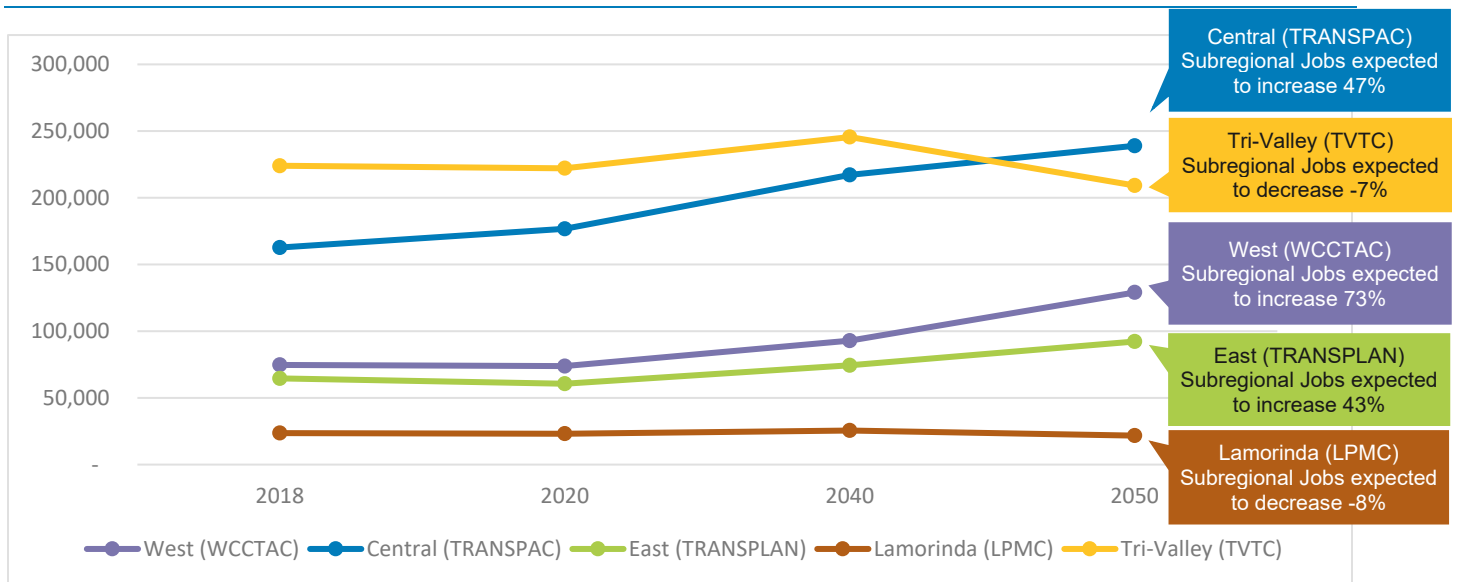
The five subregional forecasts for population growth are shown in Figure 2-2. The Central County population, represented by the blue line, is projected to grow at a rate of 30 percent between 2018 and 2040; by 2050, Central County is anticipated to be home to about 412,151 people, the third-highest Contra Costa County population, behind the Tri-Valley and East County areas.

Figure 2-2: Subregional Population Growth⁷



Subregional forecasts for jobs are shown in Figure 2-3. Again, Central County is represented by the blue line. Countywide, jobs are expected to grow faster than population, and Central County is projected to experience significant job growth of 47 percent between 2018 and 2050, the second-fastest growth rate when compared to other subregions, only behind West County.

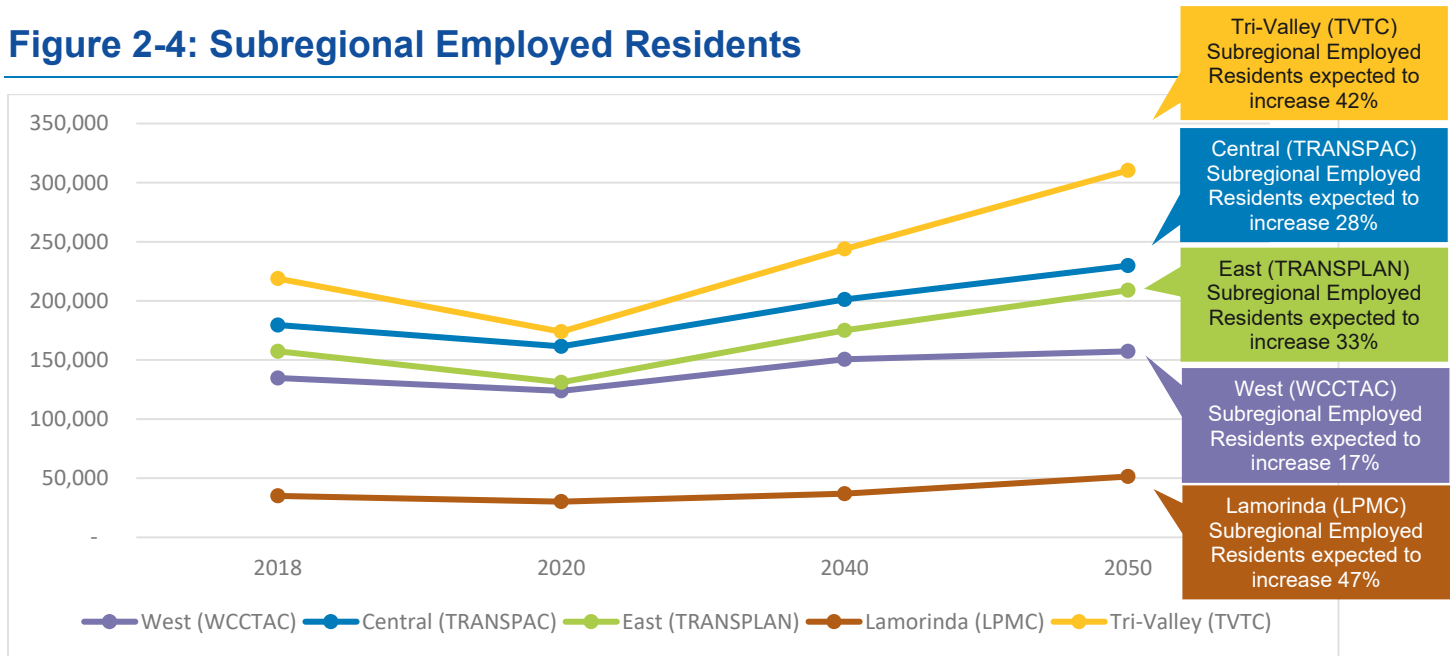
Figure 2-3: Subregional Job Growth



⁷ The projected decline in West County population is a result of a disconnect between Plan Bay Area 2050 projections and the population projections previously assumed for 2040 in the CCTA Travel Demand Model.

Subregional forecasts for employed residents are shown in Figure 2-4. Again, Central County is represented by the blue line. In the Central County subregion, the percentage of employed residents is expected to grow more similar to population than to jobs, with 28 percent projected growth of employed residents between 2018 and 2050, the second lowest when compared to other subregions.

Figure 2-4: Subregional Employed Residents

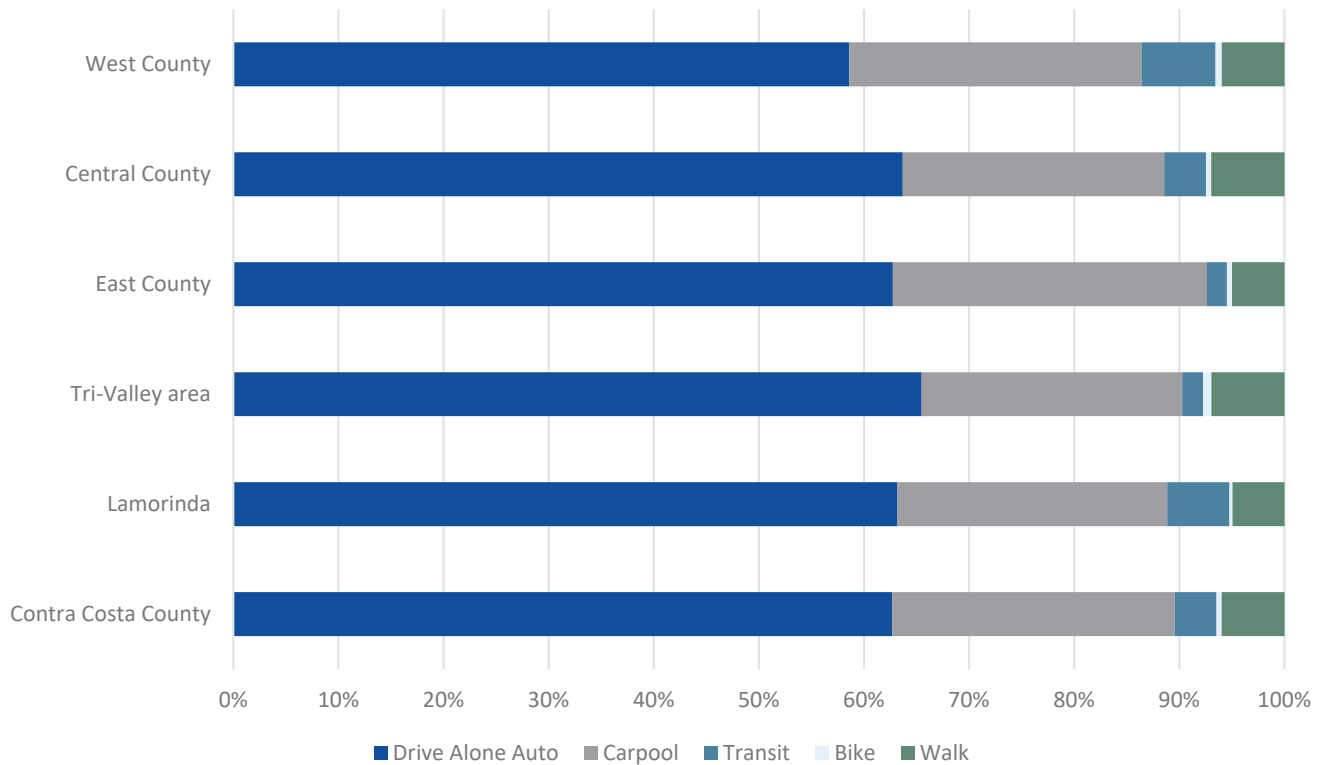


Commute Patterns and Travel Demand Forecasts

The regional Travel Demand Model was applied to generate estimates of the future traffic volumes expected on major roadways throughout the county. As with all subregions in the county, traffic volumes throughout Central County are anticipated to increase each year as the local population continues to grow. It should be noted that the model results shown in this chapter are intended to give an idea of the order-of-magnitude changes in traffic volumes anticipated across the region; much more detailed and refined studies would be undertaken for any specific project.

Countywide Mode Share

Each of the five CCTA subregions is geographically and socioeconomically unique. Some subregions have more dense, urban development that is quite conducive to transit and active transportation, and others are suburban or have hilly geographies that make transit and active transportation less viable. Therefore, the mode share for each mode of transportation varies between subregions, as illustrated in Figure 2-5.

Figure 2-5: Mode Share of All Trips by Subregion (2019)

Modeled Mode Share

Understanding mode share and how to shift it is key to changing the transit system and the active transportation system, and to curbing the transportation system's impact on climate change. The modeled and forecast mode shares are derived from CCTA's trip-based travel demand model. It is important to note that this model does not account for shifts in travel patterns that emerged in response to the COVID-19 pandemic and that may carry forward into the future. Therefore, the forecast results do not reflect increased rates of remote work that have occurred for some jobs.⁸ Also note that the mode shares for active transportation only reflect trips that are made primarily by bicycling or walking. Walking or bicycling to reach transit stops is not counted as a separate active transportation trip but only as a transit trip.

⁸ Some jobs, such as service jobs or healthcare, can only occur in person. However, many online-based jobs that are typically considered to be "white collar" jobs are able to be conducted remotely. As mentioned in the COVID-19 Effects section, only some of the online-based jobs that experienced a shift to remote work during the pandemic will remain that way. A future update of the Central County Action Plan can better understand the rate of post-pandemic remote work and the impact it has on mode share.

Reported Current Commute Mode Share

The American Community Survey estimates, published by the United States Census Bureau, report the number of work trips by mode. An estimated mode share based on this data is shown in Table 2-1, which shows the commute mode share for Contra Costa County and the Central County subregion. As shown in Table 2-1, in 2019, about 79 percent of the work trips in Contra Costa County are made by automobile, either driving alone or by carpool, compared with 76 percent by automobile in the Central County subregion. The Travel Demand Model does not include various improvements that would be accomplished in this Action Plan. Therefore, by 2050, the mode shares are projected to remain similar to existing conditions.

Table 2-1: Means of Transportation to Work in Contra Costa County and the Central County Subregion (2019)

Mode	Contra Costa County			Central County Subregion		
	Estimate	Margin of Error	Percentage Mode Share	Estimate	Margin of Error	Percentage Mode Share
Total:	544,376	±3,447		166,294	±3,445	
Car, truck, or van - drove alone	367,467	±3,409	68%	111,651	±2,793	67%
Car, truck, or van - carpooled	62,385	±2,486	11%	14,516	±1,141	9%
Public transportation (excluding taxicab)	59,068	±1,981	11%	21,336	±1,128	13%
Taxicab, motorcycle, bicycle, walked, or other means	19,344	±2,462	4%	7,601	±851	5%
Worked from home	36,112	±1,310	7%	11,188	±780	7%

Source: American Community Survey 5-Year Estimates, Table B08301.

Note: The American Community Survey shows that seven percent of Central County workers were found to work remotely in 2019. While the number of workers working remotely rose dramatically during the COVID-19 pandemic, there is no reliable data on the exact percentage. The “work from home” mode is accounted for in the Countywide Model during the trip generation step by omitting those trips. In this forecast, “work from home” is assumed to continue at current levels. As COVID-19 recedes and workers begin to return to commuting, new data will become available and will be incorporated in the next model update to reflect higher percentages of “work from home” based on the new survey data.

Modeled Commute Mode Share

Mode shares for home-to-work trip purpose have been calculated based on the residence location (Table 2-2) or the work location (Table 2-3). These tables report mode shares for both Central County and Contra Costa County as a whole. The modeling results show that most work trips by Central County residents are made by automobile, specifically those driving alone. Central County's transit mode share for work trips is similar to the county's, reflecting the available BART service and various bus routes. Active transportation trips account for a very small, yet higher than the county, portion of commute trips made by Central County residents. Note that the bicycle mode share only reflects trips made by bicycle from beginning to end and does not count access trips to and from transit stops.

The mode shares for Central County commuters are projected to remain relatively similar to existing shares, with modest decreases in the drive-alone auto and an increase in active transportation mode shares.

As shown in Table 2-3, commuters to jobs in Central County predominantly use the automobile modes to get to work, especially driving alone. Transit and active transportation account for very small shares of this market. The Travel Demand Model does not code various improvements that would be accomplished in this Action Plan. Therefore, by 2050, commute mode shares are predicted to remain much the same by 2050, with a moderate increase in the transit mode share.



Table 2-2: Modeled Home-to-Work Mode Share: Central County Residents

	Contra Costa County		Central County Subregion	
	2019	2050	2019	2050
Drive-Alone Auto	72%	70%	72%	70%
Carpool	14%	15%	13%	13%
Transit	12%	13%	13%	13%
Bicycle	0.3%	0.5%	0.4%	0.7%
Walk	1.4%	2%	2%	3%

Source: CCTA travel demand model and DKS Associates.

Note: Mode shares calculated with home-based work person trip ends at the production (home location) zone. Totals may not add due to rounding.

Table 2-3: Modeled Home-to-Work Mode Share: Jobs in Central County

	Contra Costa County		Central County Subregion	
	2019	2050	2019	2050
Drive-Alone Auto	83%	79%	83%	80%
Carpool	12%	13%	12%	13%
Transit	3%	4%	2%	3%
Bicycle	0.4%	0.7%	0.4%	0.7%
Walk	2%	3%	3%	3%

Source: CCTA travel demand model and DKS Associates.

Note: Mode shares calculated with home-based work person trip ends at the attraction (work location) zone. Totals may not add due to rounding.

Mode Share for All Trip Purposes

Table 2-4 reports the mode share calculated for all trip purposes in the CCTA travel demand model—from home to work, shopping, social/recreation, grade school, high school, and college as well as trips not starting from home. The modeling results for the county show that most trips in 2019 were made by automobile, with transit and active transportation modes accounting for less than 12 percent of all trips.

The Travel Demand Model does not code various improvements that would be accomplished in this Action Plan. By 2050, the mode shares are projected to remain similar to 2019 conditions, with a decrease in both transit and walking mode shares and an increase in bicycle mode share in the Central County subarea.

Table 2-4: Mode Share for All Trips: Central County Subregion Residents⁹

	Contra Costa County		Central County Subregion	
	2019	2050	2019	2050
Drive-Alone Auto	63%	63%	64%	63%
Carpool	27%	28%	25%	28.7%
Transit	4%	3%	4%	2.5%
Bicycle	0.5%	1%	0.5%	0.9%
Walk	6%	6%	7%	4.6%

Source: CCTA travel demand model and DKS Associates.

Note: Totals may not sum due to rounding.

⁹ Note that projections in Table 2-4 are anticipating mode share shifts based on the CCTA Travel Demand Model and already planned for and/or funded projects. Therefore, some modes such as carpooling, transit, and bicycle are projected to decrease through 2050. This projection does not take into account the improvements adopted in this Action Plan; therefore, the 2050 share of these modes is anticipated by Central County jurisdictions to be higher than reported in Table 2-4.

Transit

Central County is more connected via public transit than some other Contra Costa subregions and some Bay Area communities. Forms of public transportation include passenger rail and BART rail, one proposed ferry station, and over a dozen bus routes (including service to Alameda County and San Francisco). Several bus services transport residents and workers into and out of the subregion and the county. See Chapter 5, Transit, Figure 5-1, for a map depicting these routes and facilities.

Measure C (CCTA 1988) helped to fund the extension of BART from the Concord Station (which used to be the end of the line) to the North Concord Station, and over the hill to Pittsburg/Bay Point. The existing 2017 Central County Action Plan and the CTP resulted in several positive transit system programs and developments. These include, but are not limited to, BART station improvements, free shuttle service in downtown Walnut Creek, and various paratransit access programs.



As discussed previously, the COVID-19 pandemic caused a decrease in use of public transportation that is still reverberating throughout Contra Costa County. In 2019, Central County transit trips accounted for just over four percent of all trips in the subregion. The long-term behavior change that the COVID-19 pandemic may cause in terms of transit ridership is unknown. However, it is the goal of this Action Plan to increase transit ridership to meet, then exceed, pre-pandemic levels. See Chapter 5, Transit, for more information on objectives and actions to achieve this goal.

Active Transportation

Central County has a robust active transportation network, which includes low-stress facilities, such as Class I dedicated, multiuse trails, Class IIIB bicycle boulevards, or Class IV protected bicycle facilities on roadways. These facilities, in conjunction with a network of non-low stress facilities, Class II and III, offer opportunities for both recreational and commute bicycle and pedestrian traffic to traverse the subregion.¹⁰ See Chapter 6, Active Transportation, Figure 6-1, for a map depicting these routes and facilities.

Active Transportation

Active transportation is the movement of people or goods through nonmotorized means, usually through human activity like walking, pedaling, or rolling. It is essential for the reduction of carbon emissions, improving public health through physical activity, and increasing ADA-accessible spaces. Forms of active transportation can include shared and privately owned micro-mobility devices, standard or electric bicycles, wheelchairs, and more.

The existing 2017 Central County Action Plan and the CTP resulted in several successful bicycle and pedestrian projects, including, but not limited to, completion of gaps in several multi-use trails, including completion of additional Iron Horse Trail segments, and identifying property owners of commercial uses adjacent to trails for collaborative coordination to improve connectivity.

Despite these facilities, bicycle and pedestrian travel modes remain low, accounting for 7.5 percent of all Central County trips in 2019. See Chapter 6, Active Transportation, for more information on objectives and actions to achieve bicycle and pedestrian goals.

Roadways

The Central County roadway network is the most comprehensive travel network in the county and provides facilities for both automobile and non-automobile travel. Major facilities include State Route (SR-) 4, which links Central County to the West County and East County subregions; SR-242 that links SR-24 and I-680; plus I-680 that links Central County to the Tri-Valley subregion and Alameda County to the south and to Solano County to the north. Various other roads serve local and regional traffic. The Authority has helped fund major improvements, including, but not limited to, the completion of the Caldecott Tunnel 4th Bore, which improved the travel experience of Central County residents.

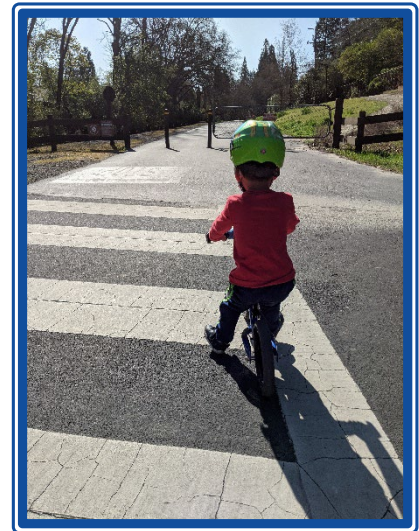


¹⁰ Class I facilities are bicycle paths or shared-use paths with exclusive right-of-way for bicyclists and pedestrians, split from automobile traffic. Class II facilities are bicycle lanes on the perimeter of streets, defined by pavement striping and signage to delineate a portion of the roadway for bicycle travel. Class III facilities are routes that are shared by both automobiles and bicycles, often represented through painting or signage on the roadway. Class IIIB facilities are the same as Class III except there are additional protections for bicycles, such as bollards, to reduce the amount of automobile traffic or designation of streets as one-way for automobiles. Class IV bicycle facilities are similar to Class II facilities except there is a physical barrier that separates the automobile and bicycle traffic for enhanced safety.

As described in the beginning of Chapter 2, the impacts of the COVID-19 pandemic on the transportation network, mainly roadways, is ongoing and the future of congestion on these roadways is uncertain. It is estimated that approximately 92 percent of trips in Central County are made by vehicle, either driving alone or as a carpool. This percentage translates to 29 VMT per capita in the subregion. The roadway and vehicle goals in this Action Plan aim to decrease both the mode share of SOVs vehicles and VMT, while increasing the carpooling mode share. See Chapter 7, Roadways, for more information on objectives and actions to achieve these roadway and vehicle goals.

Safety

Safety is a foundational consideration of the transportation system and affects the lives and well-being of all Central County residents for all modes of transportation. Major collision, severe injury, and death can occur if a Safe System Approach for infrastructure design is not implemented. Collisions that result in death or severe injury may increase proportionally as population increases, particularly without a Safe System Approach, major improvements to infrastructure, and programming focused on improving safety for all, with a focus on vulnerable users, including seniors and people walking or bicycling. However, this Action Plan includes goals, RTOs, and actions that aim to reduce and eventually eliminate collisions resulting in death or severe injury, per the Authority's adopted core principles of Vision Zero.¹¹ Vision Zero is a strategy that aims to eliminate all fatalities and severe injuries that result from traffic collisions. The Vision Zero approach views transportation-related fatalities as preventable, not inevitable, and relies on multidisciplinary collaboration that is informed by data and is focused on equity. CCTA and their member jurisdictions and partners are committed to the Vision Zero approach and to a Safe System Approach that will enhance the existing transportation network and leverage future projects to ensure a safe environment for all.



If accompanied by a Safe System Approach to public right-of-way design and construction, intelligent transportation technologies can improve safety through vehicle technology deployment. Examples include connected/autonomous vehicles, smart traffic signals with bicyclist and pedestrian detection, and physical improvements such as roadway design, physically separated active transportation infrastructure, connectivity, broader educational outreach, training, and ongoing professional development. The challenges of our community's safety of people traveling will increase as mobility increases, especially along shorter trips. Safety is a top priority of the Action Plan. See Chapter 8, Safety, for more information on objectives and actions to achieve these safety goals.

¹¹ CCTA codified Vision Zero work through Resolution 21-40-G, which adopts the Contra Costa Countywide Transportation Safety Policy and Implementation Guide for Local Agencies.

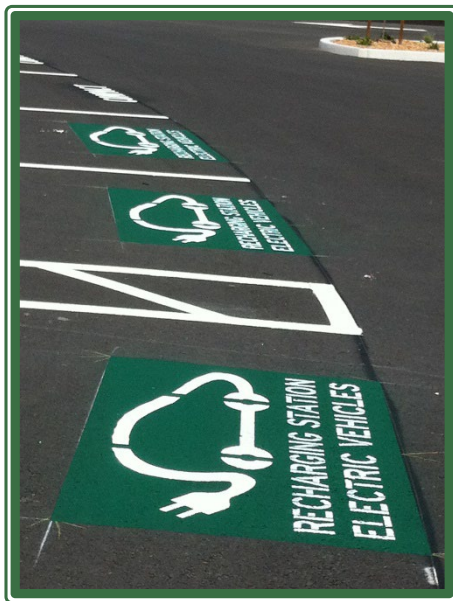
Equity

Residents in and from low-income communities are disproportionately burdened by air pollution, traffic congestion, risks to individual and public health, and limited access to services and resources such as healthy food, banking, health services, parks, schools, and other important locations that support a healthy and prosperous lifestyle. These inequities are partially due to lack of access to essential goods and services, lack of proximity to transportation options, and inability to own a vehicle (let alone upgrade to an electric or hybrid vehicle). These inequities are important to consider within the transportation system to ensure that communities with disproportionately less access to the greater community are considered in long-term transportation planning processes.

This Action Plan focuses its equity goals, policies, RTOs, and Actions on “equity priority communities” designated by MTC. They are places in Central County that are documented to have less advantageous socioeconomic characteristics than the Bay Area as a whole. This Action Plan includes several initiatives to address potential inequities in these communities. See Chapter 9, Equity, for more information on objectives and actions to achieve equity goals.



Climate Change and GHG Trends and Forecasts



Climate change is a significant challenge facing people and the planet, and transportation is the largest contributor of GHG emissions. The Intergovernmental Panel on Climate Change, an intergovernmental body of the United Nations whose purpose is to advance scientific knowledge about anthropogenic climate change, published its Sixth Assessment Report in 2021. The report states that the increased consumption of fossil fuels (e.g., natural gas, coal, gasoline) has substantially increased atmospheric levels of the GHGs that change the climate. The transportation system and the public's health are vulnerable to the effects of climate change, most notably changing climate and weather patterns; duration and frequency of events, such as extreme heat, drought, wildfires, storms, flooding, and sea level rise; and more needs to be done to make the system resilient to these changes. In addition to impacts on the transportation system, changes in climate adversely impact agricultural

productivity, water quality, air quality, and other living conditions, resulting in mental, physical, dietary, and socioeconomic effects. Air pollution from mobile sources, especially diesel engines, increases the risk and occurrence of asthma, lung diseases, and other preventable health impacts. Therefore, one of the Action Plan's goals is to plan for a more sustainable and resilient transportation system that reduces its carbon footprint as well as mitigates climate risk from climate hazards and other impacts.

This Action Plan addresses climate change in Chapter 10, which outlines RTOs and actions that will reduce GHGs through decisions that will support cleaner transportation options.

Innovation and Technology

CCTA and TRANSPAC, the RTPC for Central Contra Costa County, are committed to continuing to implement innovation and the deployment of new technologies to improve the transportation system. Innovative initiatives and technology added to current projects and programs could reduce traffic congestion, improve air quality, and provide new, cleaner mobility options for all Central County residents. Such innovations include, but are not limited to, in-vehicle technology, such as sensors, automated capabilities, and safety enhancements, as well as outside-of-vehicle technology, such as smart signals that employ artificial intelligence in real-time to help officials monitor and manage traffic flow and communicate to meet specific goals. Other technologies include “dynamic personal micro transit” (DPMT), and automated vehicles that could address first/last-mile connectivity issues, or “mobility as a service,” which gives riders dynamic and real-time information on available travel options at that time. See Chapter 11, Innovation and Technology, for more information on objectives and actions to achieve these goals.

Housing Development

The State of California is increasingly creating regulations that require local jurisdictions such as those in the Central County subregion to accommodate additional housing, whether such housing is locally supported or not. Simultaneously, the State has removed allowances to look at traffic congestion resulting from development as a significant impact under the California Environmental Quality Act (CEQA). Together, these changes mean that local communities may increasingly approve housing projects without finding significant traffic impacts from such projects under CEQA.

This Action Plan accounts for these changes by including measures of roadway congestion in the RTOs, and by committing that TRANSPAC and CCTA will work to make roadway capacity improvements to maintain desired LOS where possible. Nonetheless, local jurisdictions may see LOS decline as residential projects are approved, and they should not anticipate that residential projects may be denied simply due to their traffic impacts.

Conclusion: Moving Toward a Multimodal Network

As is the case in all of Contra Costa, and the entire nation, Central County’s existing transportation network was constructed primarily with a focus on the efficient movement of vehicles. However, innovation and technology; prioritization of the movement of people (most efficiently transported via transit); considerations regarding the climate, safety, and equity; and an increased interest in non-vehicular modes of transportation have made possible a shift to a more dynamic future.

This Action Plan, if thoughtfully implemented, will improve the overall quality, sustainability, equity, and safety of transportation. This Action Plan includes goals, policies, RTOs, and actions to improve the transportation system and to ensure that all people can more equitably and safely travel through, to, and within Central County.



Central County Action Plan

Chapter 3: Vision, Goals, and Policies



This chapter summarizes the vision, goals, and policies that lay the framework for this Action Plan.

Vision

The overall vision of the Action Plan is to ensure that the transportation system in Central County serves the needs of the community while accommodating and encouraging a shift in travel behavior that reduces congestion and leads to a healthier and better-quality life for all. The goals and performance measures in this Action Plan were designed to accomplish this vision and to ensure Central County jurisdictions are working holistically, tapping into various modes, and using new technology and innovation.

Long-range transportation planning in Central County and greater Contra Costa County requires a holistic, multimodal planning approach based on cooperation among all jurisdictions, partner agencies, and the community. This approach must consider all components of the transportation system simultaneously, anticipate the needs and desires of the community, and show the path to the future. Multi-jurisdictional coordination and ongoing discussions are critical to ensure that the services offered,

projects pursued, and programs launched support and build off one another. Such a holistic approach can ensure that a unified plan is implemented to meet the needs of the community.

Innovation and technology will be key to achieving this vision. They are already improving the efficiency of the transportation network in Contra Costa County. Thanks to express lanes, integrated corridor management, traffic signal coordination, ramp metering, and shared-use mobility services, the transportation system is becoming more efficient and sustainable. Additional new technologies, such as fully connected and autonomous vehicles and Mobility as a Service, if harnessed correctly, can enrich the future of transportation even further.

Goals

This Action Plan includes 10 goals for the transportation system in Central County. Some goals pertain to one mode or topic in the Action Plan, while others are multimodal and/or cover more than one topic.

1. Maintain the existing transportation system and infrastructure in a State of Good Repair to meet the needs of the Central County community.
2. Support the enhancement and expansion of an efficient transit system.
3. Encourage land use decisions that satisfy increased travel demand while reducing SOV travel and VMT.
4. Support the use, enhancement, and expansion of VMT- and GHG-reducing transportation technologies.
5. Manage and improve traffic flow and efficiency on freeways and arterial roads through a holistic planning approach that includes shared mobility and prioritizes non-SOV transportation.
6. Support active transportation modes through the creation and improvement of bicycle and pedestrian facilities.
7. Provide a safe and low-stress transportation system for all users and modes.
8. Minimize transportation impacts on the climate.
9. Ensure the transportation system is resilient in the face of climate change.
10. Support equitable mobility for all incomes, racial and ethnic groups, ages, and abilities across all modes of transportation.



Policies

1. Engage in collaborative discussions with partner agencies, jurisdictions, boards, and committees to ensure that the perspectives and concerns of all relevant parties are addressed when making regional decisions that impact transportation facilities.
2. Work with MTC and other agencies to implement regional initiatives such as One Bay Area Grant (OBAG)/priority development area (PDA) development strategies.
3. Implement the Actions in this Action Plan, and other projects and programs as needed, to achieve and maintain the RTOs in this Action Plan.
4. Consider safety as a top priority when designing new or modified travel corridors to be consistent with Countywide Vision Zero.
5. Support growth in downtowns, PDAs, transit priority areas, and other areas well-served by transit, to lessen reliance on SOVs.
6. Promote transportation alternatives to reduce demand on existing facilities in lieu of widening roadways and further impacting the natural environment.
7. Support land use decisions that improve jobs-housing balance.
8. Coordinate with economic development agencies and non-governmental organizations to attract new employment to housing-rich areas.
9. Improve transit and active transportation access to PDAs.
10. Recognize, support, and subsidize transit as an essential and free or very low-cost service for transit-dependent people.
11. Consider complete corridors, complete streets, and bicycle and pedestrian needs in all neighborhood and roadway planning and design efforts.
12. Ensure the active transportation network is attractive for all users by maintaining facilities in good working order, including pavement condition, vegetation along facilities, and debris removal.
13. Focus bicycle and pedestrian network efforts on closing gaps in the planned low-stress bicycle network, connecting key destinations such as downtowns, transit hubs and major recreation areas.
14. Work to minimize congestion and maintain RTOs on the vehicular roadway network, while also prioritizing improvements and projects that support modes other than SOVs.
15. Support Transportation Demand Management (TDM) programs that reduce VMT, improve access to transit, and increase transit ridership.
16. Encourage local jurisdictions to develop objective design standards to support the development of transit-oriented communities.

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Central County Action Plan

Chapter 4: Routes of Regional Significance



One of the key elements of an Action Plan is the designation of RRS. RTPCs have the authority to designate RRS in their regions.

RRS are facilities for which jurisdictions in the subregion want to share regional responsibility with neighboring jurisdictions. Designation of RRS helps CCTA, TRANSPAC, local jurisdictions, and the general public know which facilities are important to the region and serve as the basis for monitoring and maintenance by CCTA and TRANSPAC.

When deciding which routes to designate, the Measure J GMP guidelines recommend four conditions to consider:

1. Connect two or more subregions of Contra Costa County.
2. Cross county boundaries
3. Carry significant through traffic
4. Provide access to a regional center, regional highway, or transit facility.

A transportation facility that meets one or more of these conditions is not required to be designated as a Route of Regional Significance—designations are the purview of the RTPC.).

Some routes that meet one or more of the criteria can remain undesignated, provided that a consensus not to designate such routes is reached among affected jurisdictions. Furthermore, routes that enter or leave the RTPC require joint discussions among the affected regional committees to determine if consensus can be reached regarding designation.¹²

Historically, Action Plans have only been required to designate RRS for roadway and vehicle facilities, largely with the intent to monitor delay and congestion. Only a few non-roadway RRS were designated anywhere in Contra Costa County. However, with the understanding that the future of transportation planning requires a holistic approach and consideration of shared mobility, this updated Action Plan includes designation of RRS for transit facilities and active transportation as well as vehicles.

Competing Modes in the Action Plan

Although the State of California no longer uses level of service (LOS) as a metric to measure the impacts of developments on the transportation system, this Action Plan contains performance metrics to track traditional level of service on roadways. The Action Plan also measures vehicle miles traveled, the newly adopted metric for evaluating vehicles on the transportation system.

This Action Plan is written in a manner that supports and prioritizes non-automobile modes on certain Routes of Regional Significance, including transit or active transportation. In some cases, local jurisdictions will need to determine which goals to implement at a given time on a given facility. Therefore, it may be the case that some goals in this Action Plan could compete with one another and it will be up to the local jurisdictions and their elected officials to prioritize their own goals without conflicting with the overarching goals of the Action Plan.

¹² Note that some RRS, such as Marsh creek Road, are designated as RRS and included on Figure 4-1 with the intent that any improvements are limited to safety improvements and will not include any capacity improvements.

Multimodal Corridor Maps of Routes of Regional Significance

To characterize the multimodal nature of RRS, CCTA has worked with TRANSPAC and the other RTPCs to develop a series of multimodal corridor maps to show five different transportation modes on a single map (bus, rail, bicycle, freeway, and surface roadway). The Central County Subregion Multimodal Corridor Map is shown in Figure 4-1. The maps are intended to illustrate the multimodal nature of the transportation network and to show that multiple facilities exist in any given transportation corridor. The maps are not intended to be exact, but to show travel corridors within the multimodal transportation network. Therefore, the routes shown are general and do not include every RRS facility in Central County, instead, these maps show the general directions of multimodal transportation movement that occur in Central County.

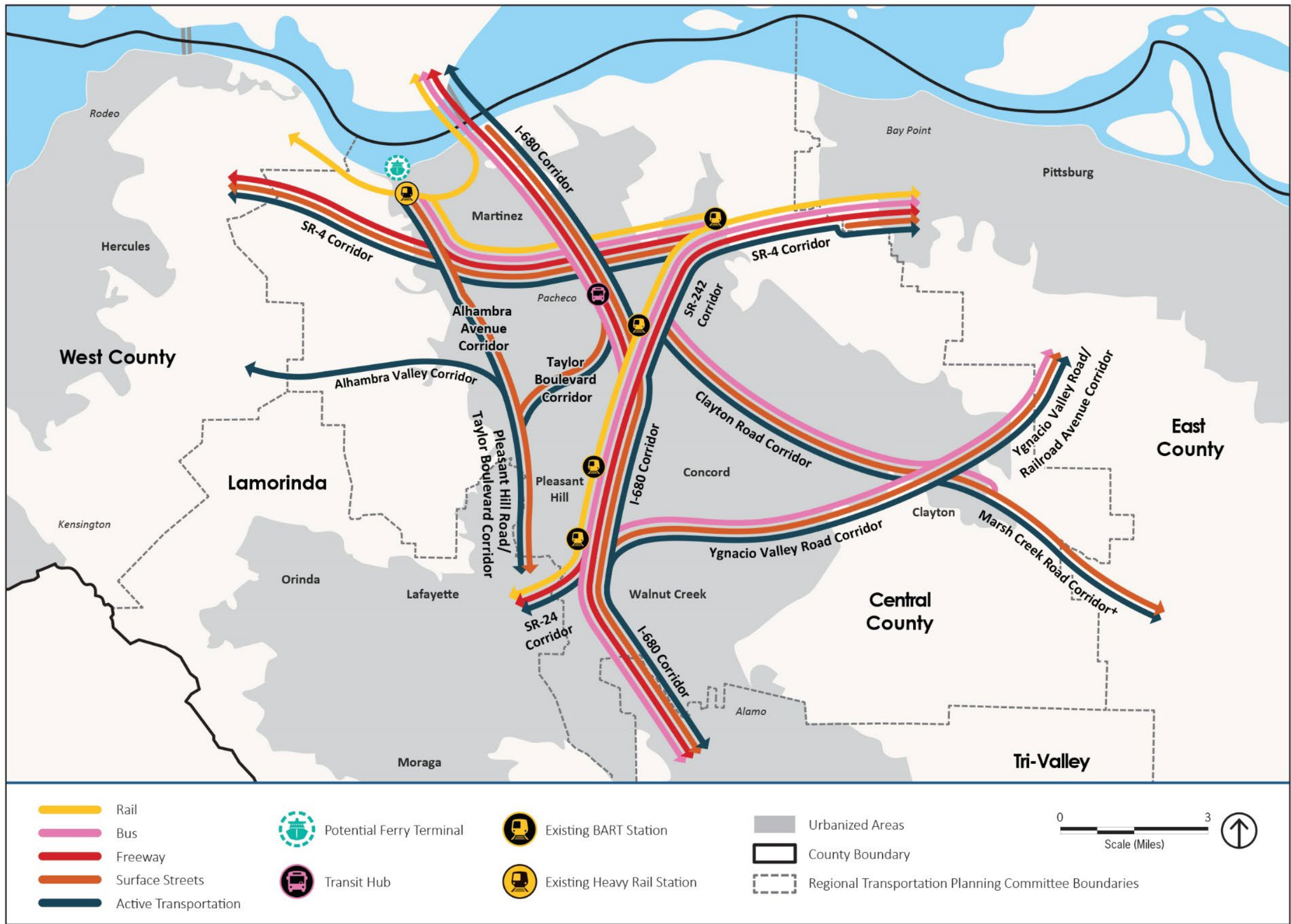
There are several critical notes to these corridor maps (also shown on the map itself):

- The new multimodal corridor maps show desired future conditions, meaning some facilities and routes shown are planned but not yet constructed.
- The corridors shown on the maps are highly generalized to show multimodal conditions where they exist or may someday exist, and therefore include multiple facilities and routes within one corridor.
- The Marsh Creek Road corridor (including Clayton Road) between Ygnacio Valley Road and Deer Valley Road is a designated RRS only for roadway safety and active transportation improvements, not for capacity improvements.



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Figure 4-1: Central County Multimodal Corridor Map



* These maps show desired future conditions, meaning some facilities and routes shown are not yet complete and may not have an adopted plan to complete them as of publication of this Action Plan.

** The corridors shown in this map are generalized to show multimodal conditions where they exist, and therefore include multiple facilities and routes within one corridor. To see mode-specific Routes of Regional Significance designated in this Action Plan, refer to Figures 5-1, 6-1, and 7-1.

*** This corridor map shows the facilities in this subregion only. See other maps for facilities in other subregions.

+ The Marsh Creek Road corridor (including Clayton Road) between Ygnacio Valley Road and Deer Valley Road is designated as a Route of Regional Significance only for roadway safety and active transportation improvements, not for capacity improvements.

Source: PlaceWorks, 2023.

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Central County Action Plan

Chapter 5: Transit



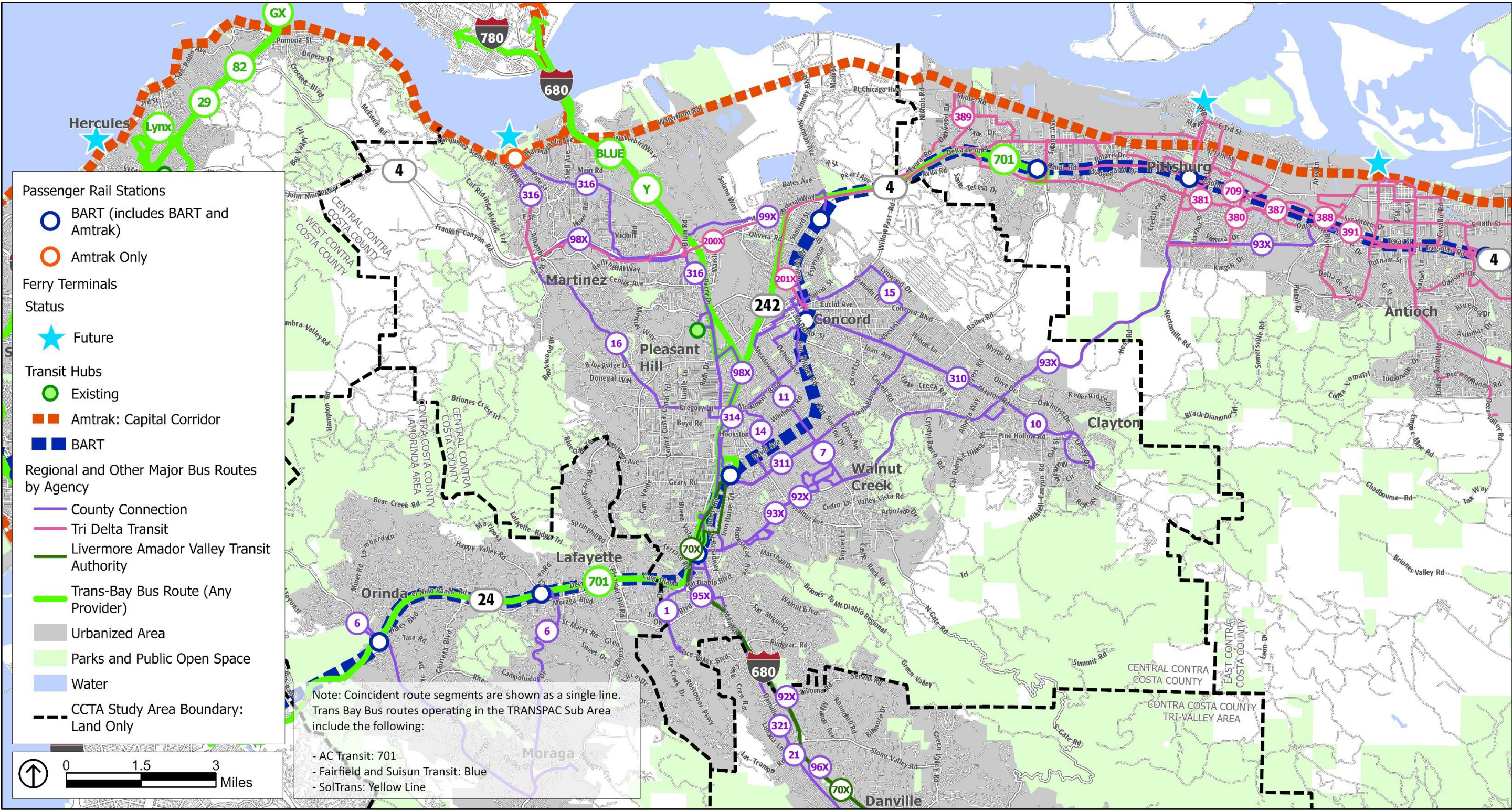
Transit in the Central County subregion includes a variety of different providers, from multiple bus operators to passenger rail. Transit service also includes vital accessible transportation services through ADA-mandated and non-ADA-mandated paratransit and community-based transportation programs for the elderly or residents with disabilities. Many of the routes and facilities vital to the Central County transit system are shown on Figure 5-1. See Table 5-1 for a summary of transit RTOs.

Table 5-1: Summary of Transit Regional Transportation Objectives

RTO Name	Definition	Existing Target	Proposed 2027 Target	Proposed 2050 Target
Transit RTO-1: Transit Mode Share	Increase mode share of transit trips	None	13% commute trips 4% of all trips	20% of commute trips 8% of all trips
Transit RTO-2: Mode Share to/from BART	Increase mode share of people accessing BART with non-vehicle modes	None	24%	34%
Transit RTO-3: Transit Trip Time	Optimize peak commute travel time on transit for key corridors	None	Transit time ≤ auto travel time	Transit time ≤ auto travel time
Transit RTO-4: High Quality Transit Access	Increase urbanized land area served by high quality transit	None	11%	25%
Transit RTO-5: Paratransit and Community-Based Transportation Program Access	Increase rides through paratransit and community-based transportation programs	None	Increase by 5%	Increase by 20%

Note: Refer to the RTO discussions in this chapter for detailed information on existing conditions and explanation of the targets

Figure 5-1: Important Transit Routes in Central County



Source: ABAG/MTC, 2021; CCTA, 2021; ESRI, 2021; PlaceWorks, 2022.

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RTOs

Transit RTO-1: Transit Mode Share

Increase the Mode Share of Transit Trips in the Subregion

This RTO tracks transit mode share and defines transit as fixed-route public transportation. It does not include general carpooling through Transportation Network Companies. As shown in Table 2-2 in Chapter 2, in 2019, 13 percent of Central County residents commuted to work using transit, compared to 12 percent of residents in Contra Costa County as a whole. By 2050, these figures are projected to increase to 13 percent for countywide transit commutes but to remain 13 percent for Central County residents. Meanwhile, Table 2-4 indicates that in 2019, four percent of Central County trips (all trips, not just commute) were taken by transit, which matches the countywide percentage of all trips taken by transit.

The COVID-19 pandemic has greatly reduced transit trips, so this Action Plan includes a performance target for transit mode share in the Central County subregion to return to pre-pandemic levels of 13 percent of commute trips by 2027 and then exceeding that mode share by 2050 to reach 20 percent of commute trips by transit. Further, this Action Plan proposes a target transit mode share of four percent of all trips by 2027 and eight percent of all trips by 2050. While these goals are ambitious, they are needed to meet local, regional, and statewide goals to minimize VMT, transportation-related GHG emissions, and traffic congestion.

Transit RTO-2: Mode Share to/from BART

Increase the Number of Riders Who Access BART Using Means Other Than Automobiles, Including Transit and Active Transportation

This metric assesses the mode used by BART riders to access BART stations in Central County.

BART and MTC conduct a ridership survey approximately once every 10 years that includes gathering information about modes used to access BART. The results of the most recent survey, conducted in 2015, are shown in Table 5-2.

The table shows that 24 percent of BART riders in Central County used non-vehicle modes to access BART stations in 2015, compared to 53 percent systemwide.

The performance target for this RTO is to restore Central County's non-vehicle BART access modes towards the pre-pandemic performance of 24 percent by 2027. For 2050, the goal is to increase the share by an additional 10 percent to reach a total of 34 percent.

This RTO will only be assessed when BART and/or MTC conduct ridership surveys, so it may not be assessed as frequently as the other RTOs in this Action Plan.

Table 5-2: Mode Used to Access Central County BART Stations (2015)

Station	Active Transportation	Transit	Total for Non-Vehicle Modes
Concord	26%	5%	31%
North Concord / Martinez	10%	1%	11%
Pleasant Hill / Contra Costa Centre	30%	3%	33%
Walnut Creek	18%	3%	21%
Total Central County	21%	3%	24%
Total BART System	44%	9%	53%

Source: MTC BART 2015 ridership survey

Note: The BART and MTC ridership study did not disaggregate access to BART stations via carpooling. Results in this table only show access to BART stations via active transportation (walking or bicycling) and via transit (bus, train, or other transit).

Transit RTO-3: Transit Trip Time

Optimize Peak-Hour and Peak-Direction Travel Time for Transit Compared to Automobile Travel Time for the Same Trip

This metric compares the peak period transit travel time on select corridors to the equivalent SOV travel time in the peak commute direction. The key corridor(s) monitored for the Central County subregion along with the comparative travel times are shown in Table 5-3.

The performance target for this RTO is that transit travel time should be less than or equal to auto time, when measured from transit station to transit station. As shown in Table 5-3, travel by BART is currently quicker in the morning westbound and afternoon eastbound directions between Walnut Creek and San Francisco and between Pleasant Hill and Oakland MacArthur station than driving that same distance.

None of the bus transit routes connecting the BART stations to the San Ramon transit center currently offer a travel time advantage to driving. By 2050, the morning southbound and afternoon northbound journeys between the Walnut Creek BART station and the San Ramon Transit center are predicted to be faster by bus (if current scheduled bus transit times are maintained via bus-only lanes or similar improvements).



Table 5-3: Travel Time Ratio for Autos vs Transit on Key Corridors

				Ratio of Transit/Drive Alone Time	
Corridor	Median Drive Time (Minutes) ^a	Scheduled Transit Time (Minutes) ^b	2050 Drive Alone (Minutes) ^c	2019	2050
Walnut Creek BART Station and Montgomery Street BART Station					
Morning – Westbound	43.37	37	104.57	0.85	0.35
Afternoon – Eastbound	45.19	35	108.80	0.77	0.32
Pleasant Hill BART Station and MacArthur BART Station					
Morning – Westbound	28.56	21	48.68	0.74	0.43
Afternoon- Eastbound	36.69	19	22.89	0.52	0.83
County Connection Route 95X Walnut Creek BART Station to San Ramon Transit Center					
Morning – Southbound	13.54	27	29.63	1.99	0.91
Afternoon – Northbound	19.14	27	34.44	1.41	0.78

a) Range of average driving time for Tuesdays – Thursdays for April 2019 from INRIX Roadway Analytics.

b) From published schedules. Note that this RTO assumes that 2050 scheduled transit trip times will remain constant. While increased population and congestion mean that transit trip times may not stay constant throughout the coming decades, there is no appropriate model by which to predict the change that may occur in transit trip times. Further, it is possible that transit operators could potentially maintain existing scheduled timing by taking advantage of future improvements such as bus on shoulder or express lanes, among others.

c) CCTA travel demand model congested time skims for a.m. and p.m. peak periods.

Note: Refer to Roadways RTO-2 for more information related to the trip time of the BART segments compared to driving the same segments.

Transit RTO-4: High-Quality Transit Access

Increase the Proportion of Urbanized Land Area in the Subregion Served by High-Quality Transit

This RTO seeks to increase the proportion of urbanized land¹³ area in the subregion served by high-quality transit, which is defined as urbanized land area within a quarter mile of bus stops served by bus routes with headways of 15 minutes or less, or within a half mile of rail or ferry terminals. This RTO compares access to high-quality transit both pre-and post-pandemic and sets targets accordingly. Figure 5-2 illustrates that the majority of pre-pandemic high-quality transit bus lines operating in Central

¹³ “Urbanized Land” in this Action Plan is based off an ESRI-created Geographic Information System (GIS) layer called “Urban Clusters Data,” which identifies urbanized areas based on the United States Census population data. An urban area comprises densely settled cores of census tracts and/or blocks that meet minimum population density requirements, along with adjacent territory containing non-residential urban land uses with low population density included to link outlying densely populated areas.

County are still operating at a frequency of 15 minutes or less, notably County Connection routes 10 and 20. The only pre-pandemic high-quality bus lines not operating post-pandemic is County Connection route 4. Table 5-4 compares the Central County acreage of urbanized land that is within a quarter mile buffer of a high-quality bus stop and within a half-mile of a rail or ferry station. Pre-pandemic, this acreage made up 11 percent of Central County’s urbanized land, with a slight decrease to ten percent post-pandemic.

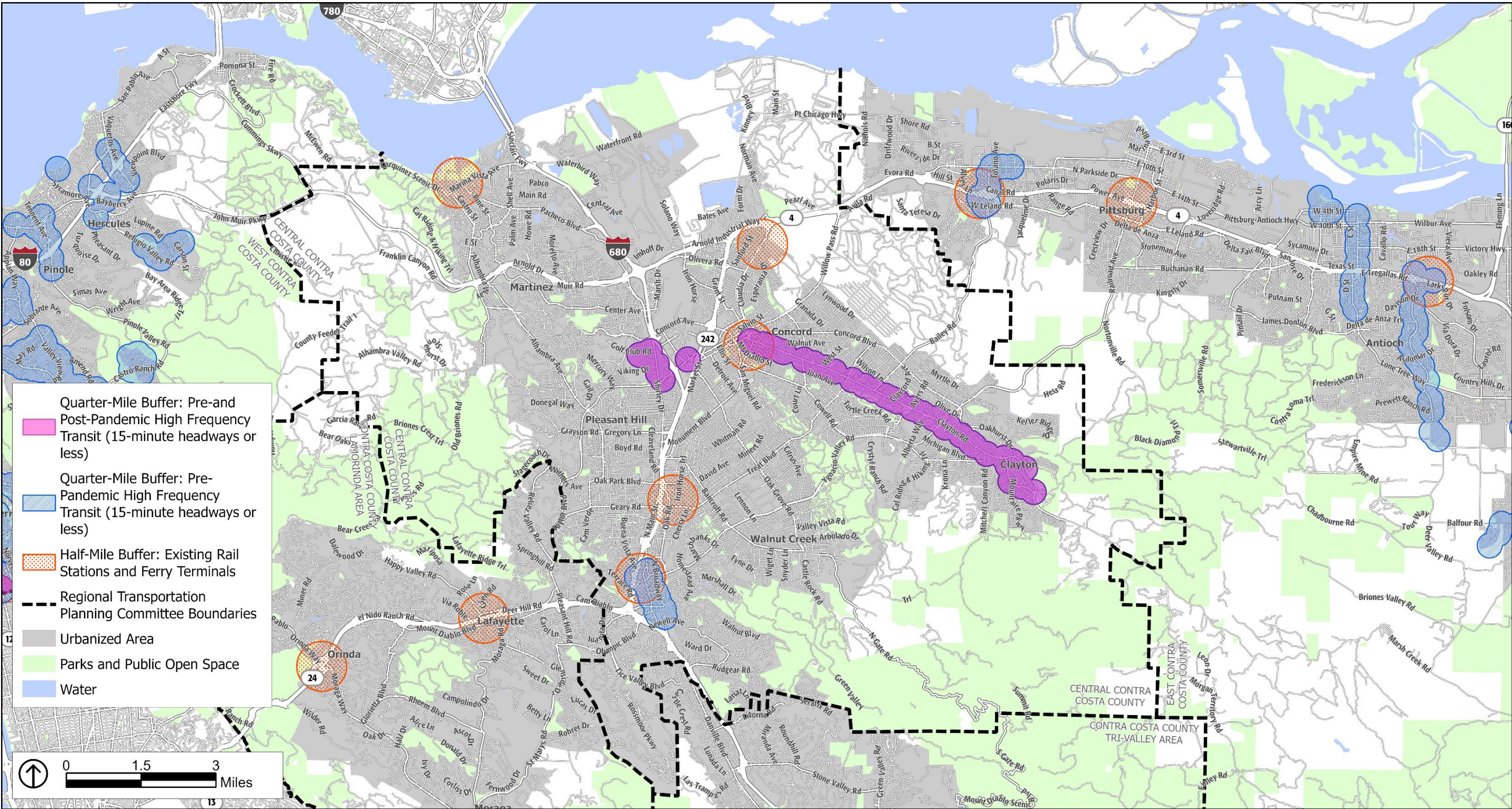
This Action Plan sets a target that the high-quality transit bus lines that operated prior to the pandemic be reinstated by 2027, to result in 11 percent of urbanized land in Central County being served by high-quality transit. Since some urbanized areas are too remote or have densities that are too low to support transit, it would not be realistic to set a goal that 100 percent of urbanized areas be served by high-quality transit. However, there is room for improvement over current conditions. Therefore, this Action Plan proposes that the subregion should aim to have 25 percent of urbanized acres served by high-quality transit by 2050.

Table 5-4: Proportion of Urbanized Land in Central County with Access to High-Quality Transit

	Pre-Pandemic Acres	Proportion of Total Acres	Post-Pandemic Acres	Post-Pandemic Proportion of Total Acres
Urbanized area in subregion with access to high-quality transit	5,281	11%	5030	10%
Total urbanized area in subregion	50,245		50,245	

Note: “Access to high-quality transit” is defined as within a quarter mile of bus stops served by bus routes with headways of 15 minutes or less, or within a half-mile of rail or ferry terminals.

Figure 5-2: Central County High-Quality Transit



Source: CCTA, 2021; ESRI, 2021; PlaceWorks, 2022.

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Transit RTO-5: Paratransit and Community-Based Transportation Program Access¹⁴

Increase the Number of Rides by Paratransit and Community-Based Transportation Programs

This metric tracks annual rides from the six paratransit and other accessible transportation programs that conduct operations in a portion, or the entirety, of the Central County subregion. These programs serve a variety of customers, from those with disabilities to the elderly. These accessible transportation operators and the number of rides provided in calendar year 2019 are listed in Table 5-5.

This Action Plan sets the goal that the number of rides provided among these Central County providers should increase by five percent by 2027 to 225,977 rides, and by 20 percent by 2050 to 258,259 rides.

Table 5-5: Number of Calendar Year 2019 Rides Provided by Central County Paratransit and Community-Based Transportation Providers

Provider	2019 Rides
County Connection LINK ^a	151,348
Vistability ^b	54,940
Mobility Matters ^b	3,374
Get Around Taxi Program	1,543
Pleasant Hill Senior Van Service	1,869
Walnut Creek Senior's Club Mini-Bus	2,142
Total Rides	215,216

a) These programs are ADA-mandated programs.

b) These providers operate in areas throughout Contra Costa County and therefore the number of rides includes all rides, not only those that in the Central County subregion.

¹⁴ CCTA, TRANSPAC, and Central County jurisdictions recognize that tracking paratransit rides is not a true measure of success when looking at countywide accessible transportation. For instance, several non-profits encourage those using on-demand paratransit services try fixed-route transit services to meet certain needs. Use of fixed-route transit is not accounted for in this RTO. CCTA, TRANSPAC, and Central County jurisdictions recognize that there may be more opportunities to track accessible transportation programs in a meaningful way in the next Action Plan update. This is particularly true with ongoing work that CCTA is doing as a result of their Accessible Transportation Strategic Plan adopted in 2021.

Actions

The following Actions are necessary to achieve the RTO targets and to implement other goals and policies of this Action Plan, the CTP, and other regional long-range planning documents with shared priorities. For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion's incorporated cities and the unincorporated portion of central Contra Costa County. All Actions are enumerated in a summary table in Appendix C, which also lists the responsible agency, partner agencies, and proposed timeline for each Action.

- Transit-1: Work with CCTA, local jurisdictions, and local public transit operators to:
 - Link transit service in the entire subregion, including more directly to communities within Central County, between BART stations, and between adjacent Central County communities.
 - Standardize operations, regional mapping, and wayfinding.
 - Implement traffic signal management and bus prioritization technology on transit RRS to improve bus speed and reliability.
 - Implement improvements that increase the capacity and efficiency of local transit on Regional Routes.
 - Promote coordination of transfer times among Express bus, feeder bus, BART, and park-and-ride lots.
- Transit-2: Complete general improvements to BART stations to increase their use, including:
 - Pursue projects and programs that improve the passenger experience, such as upgrade systems, modernize stations, and expand the passenger capacity of BART stations.
- Continue to work with CCTA and local jurisdictions to improve circulation and prioritize walking, bicycling, and bus transit access near major transit stops and stations.
- Transit-3: Support the expansion of ferry service to and from San Francisco and Contra Costa County.
- Transit-4: Implement the recommendations of the Contra Costa Accessible Transportation Strategic Plan, including the establishment of a new Coordinating Entity and establishing new, ongoing, and dedicated funding sources.
- Transit-5: Develop a program to establish, operate, and maintain existing and additional public or private park-and-ride facilities at appropriate locations, including shared-use agreements at activity centers with underutilized parking spaces.
- Transit-6: Work with local jurisdictions to develop intermodal transportation facilities ("Mobility Hubs") that serve major activity centers and connect transit, pedestrian, bicycle facilities, and car/ride share in their planning documents, and site park-and-ride facilities where needed and feasible.
- Transit-7: Participate in current or future studies regarding rail options for the Central County area and continue exploring development of new rail stations.

- Transit-8: Work with CCTA and local transit operators to explore financial incentives and reduced fares for public transit, including a feasibility study to explore a subregional or countywide Universal Basic Mobility program.
- Transit-9: Evaluate systemwide bus stop improvements; make it safer and easier for people to access transit stations; and ensure that transit, and its related pedestrian access and connectivity, is safe and attractive.
- Transit-10: Provide educational awareness of public transportation options through outreach, education, and advertising, particularly in local schools.
- Transit-11: Assist local jurisdictions in reviewing and considering options for improving curb management and bus and truck loading on public streets.
- Transit-12: Work with CCTA to fund and develop a regional mapping data services digital platform to enable the standardization and routine updating of digital and paper maps across all transit services.
- Transit-13: Complete a feasibility study to explore feasibility of a Regional Express Bus Program and expansion and enhancement of Bus Rapid Transit, along transit corridors and RRS.
- Transit-14: Adopt local policies that prioritize safety for the most vulnerable users at all stages of project planning and delivery.
- Transit-15: Work with CCTA and local transit providers to ensure real-time online transit information for all routes.
- Transit-16: Assist local jurisdictions in the development of design guidelines and objective design standards to support transit-oriented development in downtowns, PDAs, transit priority areas, and other areas well served by transit.
- Transit-17: Work with CCTA and public transit providers to identify and prioritize a network of transit corridors for transit signal priority, part-time transit lanes, transit-only lanes, and other transit-focused improvements.
- Transit-18: Work with CCTA and the future accessible transportation Coordinating Entity to explore additional RTOs related to accessible transportation for inclusion in the next Action Plan update.
- Transit-19: Work with CCTA and local transit providers to reinstate high-quality transit that operated in the subregion prior to the pandemic.



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Central County Action Plan

Chapter 6: Active Transportation



Active transportation in the Central County includes a variety of different activities—walking, bicycling (including electric-assist bicycling), rolling, micro-mobility, and others. An increase in active transportation mode share of all trips can help Central County reach broad transportation, environmental, and public health goals that are shared by all of Contra Costa and the Bay Area. Active transportation also contributes to improved traffic congestion. Although active transportation modes tend to be used on more than just bicycle and pedestrian facilities, a dedicated active transportation network called the Low-Stress Bicycle Network (LSBN) is planned and published as part of the CCTA 2018 *Countywide Bicycle and Pedestrian Plan* (CBPP). This chapter describes the network and explains the metrics used to complete and track progress toward implementation of a contiguous low-stress network of bicycle paths with Level of Traffic Stress 1 or 2 (of four). The desired contiguous LSBN is shown on Figure 6-1. See Table 6-1 for a summary of active transportation RTOs.

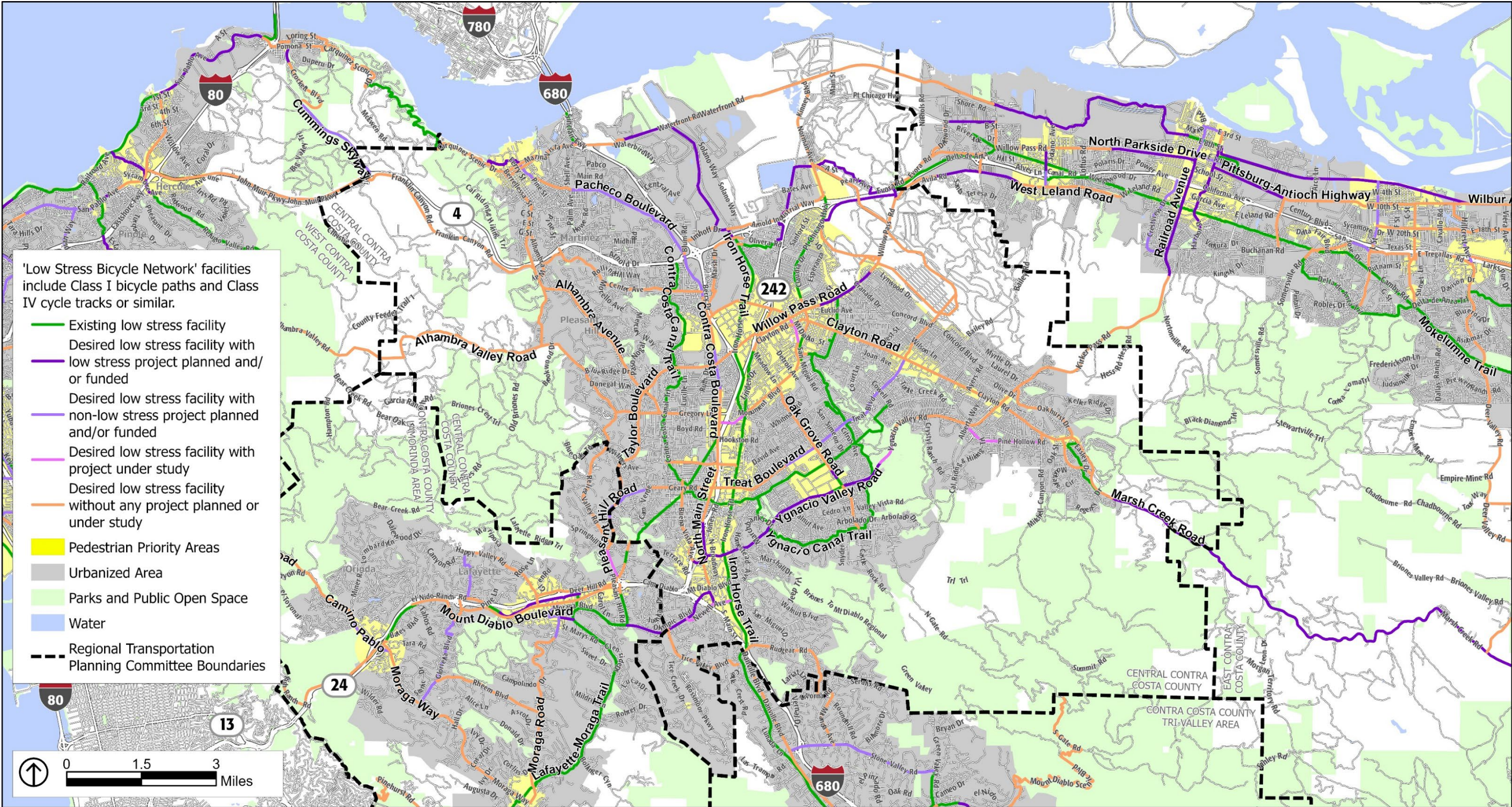
Table 6-1: Summary of Active Transportation Regional Transportation Objectives

RTO Name	Definition	Existing Target	Proposed 2027 Target	Proposed 2050 Target
Active Transportation RTO-1: Active Transportation Mode Share	Increase active transportation mode share	None	7.5% all trips ^a 2.4% commute trips	12% all trips 4% for commute trips
Active Transportation RTO-2: Low Stress Bicycle Network	Increase completeness of the LSBN	None	41%	90%
Active Transportation RTO-3: Unprotected Trail Crossings	Eliminate unprotected crossings of the LSBN intersections with roadways	None	No unprotected crossings	No unprotected crossings

a) "All trips" refers to all trips with an origin or destination in Central County.

Note: Refer to the RTO discussions in this chapter for detailed information on existing conditions and explanation of the targets

Figure 6-1: Central County Low-Stress Bicycle Network



Source: ABAG/MTC, 2021, 2019; CCTA, 2022; ESRI, 2021; PlaceWorks, 2022.

Note: The status of specific segments on this map is taken from the CCTA 2018 Countywide Bicycle and Pedestrian Plan (CBPP) project list, the revised 2022 CBPP project list, adopted Bicycle and Pedestrian Master Plans from individual jurisdiction, and consultation with local staff. “Desired Low Stress Network” refers to what the entire Low Stress Bicycle Network would look like upon completion, per the 2018 CBPP.

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RTOs

Active Transportation RTO-1: Active Transportation Mode Share

Increase the Mode Share of Active Transportation in the Subregion

As shown in Table 2-2 in Chapter 2, in 2019, less than three percent of Central County residents commuted to work through active transportation such as bicycling or walking. This number is higher than countywide active transportation commute mode share of 1.7 percent. These percentages are projected to naturally increase over time to 3.7 and 2.5 percent, respectively, by 2050.^T As shown in Table 2-4, in 2019, 7.5 percent of all trips (not just commute trips) were taken by active transportation in Central County, compared to 6.5 percent of all countywide trips. Table 2-4 shows that these figures are anticipated to slightly decrease for Central County trips and slightly increase for countywide trips by 2050 if no action or improvements are taken, which reflects the fact that the Travel Demand Model does not include active transportation improvements, including this Action Plan, in its forecasting.



This Action Plan sets a target that active transportation commute trips increase to match pre-pandemic levels and to increase to four percent by 2050. Further, This Action Plan includes active transportation mode share performance targets for all trips, including an increase to match pre-pandemic levels of 7.5 percent and to further increase to 12 percent by 2050. These goals are ambitious but necessary to meet goals to minimize VMT, transportation-related GHG emissions, and traffic congestion.

Active Transportation RTO-2: Low-Stress Bicycle Network

Increase the Proportion of the Countywide Low-Stress Bicycle Network Completed in the Subregion

The CBPP introduced a new way of evaluating a facility's level of traffic stress in which roadways are evaluated on several factors, including speed and number of vehicles and presence and width of bicycle facilities. Facilities are given a rating from one (least stressful) to four (most stressful) to evaluate the stress a bicycle rider will experience. The goal of the 2018 CBPP is to ensure the LSBN is complete and rated either Level of Traffic Stress 1 (most people of all ages and abilities can feel safer bicycling on these facilities physically separated from vehicular traffic) or Level of Traffic Stress 2 (the "interested but concerned" adult population will feel safer bicycling on these facilities). Ultimately, construction of the entire LSBN would result in an increase in active transportation mode share and a reduction in KSI collisions.

The status of the entire Central County portion of the LSBN is shown on Figure 6-1. If the entire LSBN in the Central County subregion were completed, it would have 178.2 miles of Class I, Class IIIB, or Class IV facilities.

Table 6-2 shows that 23 percent of Central County's LSBN is constructed as of 2022. An additional 12 percent of low-stress facilities are incomplete but have a locally adopted plan to construct the facility toward a more contiguous countywide LSBN. There are projects proposing improvements that would not result in low-stress facilities on an additional five percent of the LSBN, and less than two additional percent is designated "under study." A total of 57 percent of the total LSBN miles are incomplete and do not have a plan to complete them or to study them further.

This Action Plan proposes that the subregion aim to achieve 90 percent completion of the LSBN by 2050, with an interim target of 41 percent (72.5 miles) by 2027. This is the sum of existing completed facilities (23 percent) and 150 percent of the already proposed low-stress additions to the network.

Table 6-2: Proportion of Central County LSBN Completed (2022)

Status of Facility	Miles	Percentage
Existing Low-Stress Facility	40.3	23%
Desired Low-Stress Facility with Low-Stress Project Planned and/or Funded	21.5	12%
Desired Low-Stress Facility with Non-Low Stress Project Planned and/or Funded ^a	9.6	5%
Desired Low-Stress Facility with Project Under Study	4.4	2%
Desired Low-Stress Facility without any Project Planned or Under Study	102.4	57%

a) This category means that there is a project planned and/or funded in an existing plan that would complete a Class II or Class III facility but not a Class I, Class IIIB, or Class IV facility, which are considered low stress.

Active Transportation RTO-3: Unprotected Trail Crossings

Eliminate the Number of Locations Where the Low-Stress Bicycle Network Makes an Unprotected Crossing of a Heavily Traveled Vehicle Route

This metric maps and tracks the status of intersections between the LSBN and heavily traveled roadways,¹⁵ as illustrated on Figure 6-2. The level of protection at each intersection is classified as:

- ▣ **Fully protected** by grade separation or a signalized intersection with bicycling protections such as a waiting bay or concrete barriers.
- ▣ **Semi-protected** at an at-grade crossing with a beacon system, or with a signal but without pedestrian or cyclist protections through a grade separation.
- ▣ **Unprotected** at an at-grade crossing that includes none of the improvements listed above.

As illustrated on Figure 6-2, there are three study intersections in the Central County subregion that are currently unprotected and 24 that are considered semi-protected. The unprotected intersections are:

- ▣ Bicycle facility along Port Chicago Highway crossing the eastbound SR-4 freeway off-ramp
- ▣ Briones to Mount Diablo Regional Trail crossing at Buena Vista Avenue
- ▣ Ygnacio Canal Trail crossing with Oak Grove Road

This Action Plan sets a target to modify the three unprotected intersections to become fully protected by 2027. Further, this Action Plan sets a target that the additional 24 semi-protected crossings receive improvements to become fully protected by 2050. These facilities include:

- ▣ Bicycle facility along Mesa Street crossing Cowell Road
- ▣ Bicycle facility crossing at Marsh creek Road just east of El Molino Drive
- ▣ EBMUD trail crossing at Oak Park Boulevard
- ▣ Port Chicago Highway Trail crossing with:
 - Westbound SR-4 freeway off-ramp
 - Panoramic Drive

¹⁵ Roadways included in this analysis labeled “heavily traveled” include all roadways except for routes designated as minor connectors, and local or residential routes. Routes that were analyzed include interstates, freeways, expressways, other principal arterials, minor arterials, and major collectors. It is important to recognize that there are other components of the transportation network that can be stressful to bicyclists and pedestrians, including, but not limited to, facilities with many driveway entrances and exits. Such sites are not included in this analysis due to lack of mapping data; however, they are important to consider as LSBN facilities are constructed and maintained.

▣ Contra Costa Canal Trail crossing with:

- Boyd Road
- Chilpancingo Parkway
- Concord Boulevard
- Cowell Road
- Geary Road
- Gregory Lane
- Oak Grove Road
- Oak Park Boulevard
- Oak Road
- Putnam Boulevard
- Taylor Boulevard
- Treat Boulevard



▣ Iron Horse Trail crossing with:

- Concord Avenue
- Danville Boulevard
- Monument Boulevard

▣ Ygnacio Canal Trail crossing with:

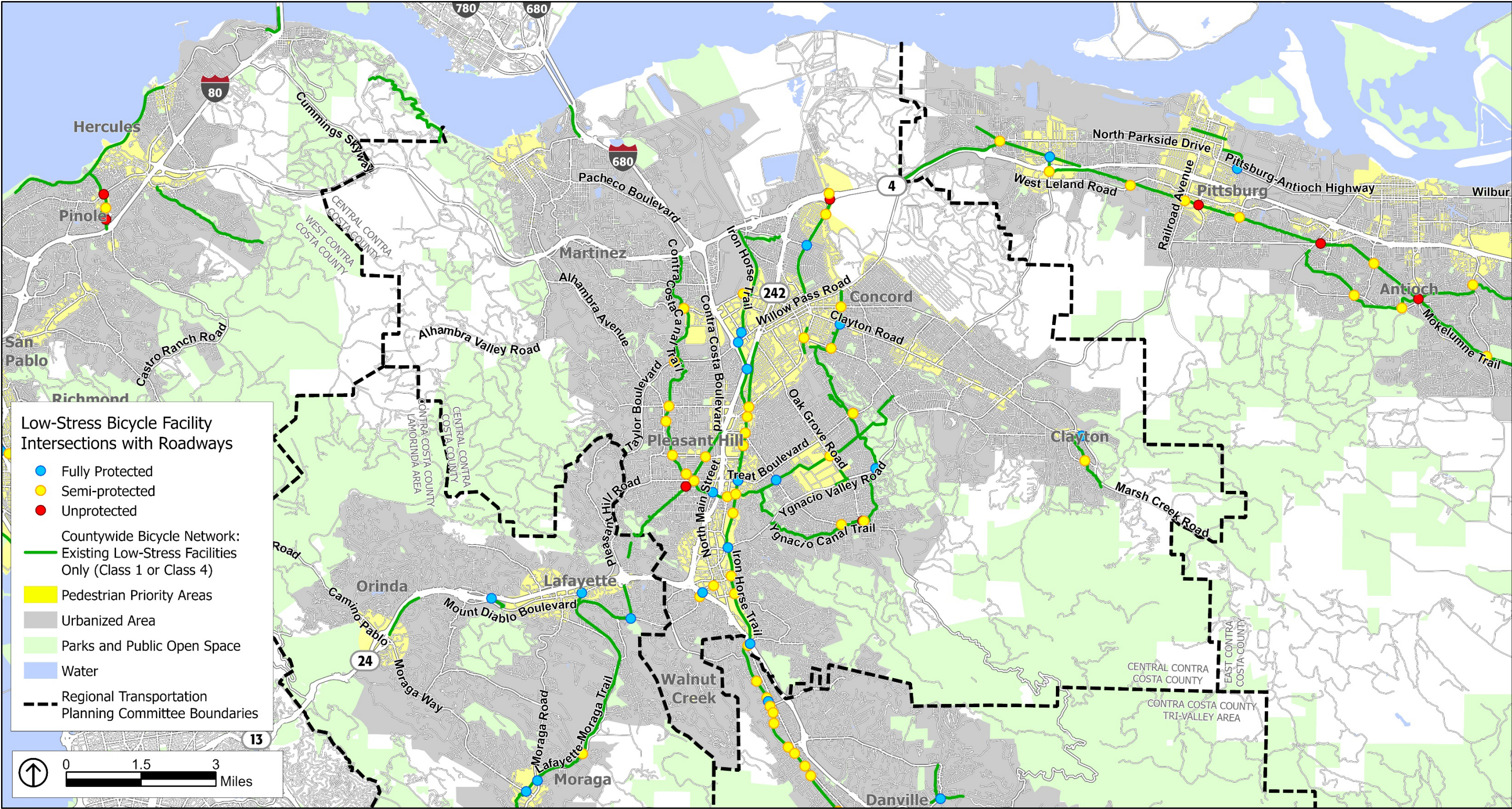
- Oak Grove Road
- Walnut Avenue

▣ Olympic Boulevard crossing with:

- Paulson Lane
- S California Boulevard

As the LSBN is constructed, new locations where the LSBN crosses a heavily traveled vehicle route will be added. Local jurisdictions should install fully protected intersection treatments for bicyclists and pedestrians at the locations listed and shown on Figure 6-2.

Figure 6-2: Status of Crossings at Intersections of the LSBN and Heavily Traveled Roadways



Source: ABAG/MTC, 2021, 2019; CCTA, 2021; ESRI, 2021; PlaceWorks, 2022.

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Actions

The following Actions are needed to achieve the RTO targets and to implement other goals and policies of this Action Plan, the CTP, and other regional long-range planning documents with shared priorities. For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion's incorporated cities and the unincorporated portion of central Contra Costa County. All Actions are enumerated in a summary table in Appendix C, which also lists the responsible agency, partner agencies, and proposed timeline for each Action.

- Active Transportation-1: Prioritize the needs of pedestrians and bicyclists in the design, construction, and maintenance of development projects.
- Active Transportation-2: Prioritize the needs of pedestrians and bicyclists and improve facilities along and connecting to RRS and activity centers.
- Active Transportation-3: Seek funding to provide bicycle parking infrastructure at employment sites and activity centers throughout Central County.
- Active Transportation-4: Work with local and regional jurisdictions to adopt and update bicycle and pedestrian plans to expand and/or improve facilities to ensure a seamless, safe, and contiguous, active transportation network that provides a positive user experience for people traveling for the daily-average distance/duration trip.
- Active Transportation-5: Construct gap closure projects in the countywide low-stress bicycle facilities network to establish a safe and contiguous network, including, but not limited to:
 - Pacheco Boulevard between SR- 4 and Arthur Road
 - Marsh Drive between the Marsh Drive Bridge over the Walnut Creek Flood Channel and Center Avenue
 - Center Avenue between Marsh Drive and the Contra Costa Canal Regional Trail
 - Imhoff Drive and Arnold Industrial Way
 - Connection of the Iron Horse Trail to the north side of Willow Pass Road
 - Between Todos Santos Plaza in Concord to the bicycle/pedestrian undercrossing of SR-242
 - Complete the marked shoulder to at least six feet wide on the road formerly known as Kirker Pass Road
 - The path along the Standard Oil utility corridor in Pittsburg between the soon-to-be-installed traffic signal on Buchanan Road to North Park Boulevard
 - SR-4 between Cummings Skyway and Hercules segment of the LSBN

Parking Electric Devices

Long-term secure e-bicycle and e-scooter parking and storage facilities are important to encourage active transportation and modal shift. These facilities can take the form of on-demand lockers that replace month-to-month rental lockers or entire bicycle rooms.

- Active Transportation-6: Construct bicycle and pedestrian crossing improvements at unprotected and semi-protected crossings of the LSBN and heavily traveled roadways.
- Active Transportation-7: Work with CCTA, Contra Costa Health Services, and Street Smarts Diablo Region to facilitate a countywide coordinated approach to Safe Routes to Schools programs, and to identify continuous (multi-year) funding sources to encourage students, employees, visitors, and residents at private and public K-12 schools, technical schools, and college sites to use non-vehicle modes to get to/from school.
- Active Transportation-8: Work with local jurisdictions to promote 511 Contra Costa's active transportation programs that increase awareness of multimodal travel options, travel behavior incentives, and safety through outreach, events, education, social media, marketing, and advertising.
- Active Transportation-9: Work with CCTA and MTC to promote Safe Routes to Transit projects and programs and submit applications for funding for construction of local Safe Routes to Transit projects and programs.
- Active Transportation-10: Continue programs that reduce the cost of using electric bicycles and pursue new programs to reduce the cost of conventional (pedal) bicycle use for Contra Costa County residents.
- Active Transportation-11: Work with CCTA, the East Bay Regional Parks District (EBRPD), and other public facilities management agencies to develop a method of tracking the Pavement Condition Index (PCI) of bicycle facility segments along the low-stress bicycle network and implement rehabilitation, repair, and replacement modifications improvements where and as needed.
- Active Transportation-12: Work with Caltrans to prepare an incident management plan for Central County freeway corridors.
- Active Transportation-13: Work with CCTA, CCWD, and the Flood Control District, to identify additional opportunities to utilize water distribution right-of-way for Low-Stress Bicycle facilities.
- Active Transportation-14: Work with CCTA and local jurisdictions to explore installation of e-bicycle charging infrastructure in publicly accessible, and convenient places including trails, shared mobility hubs, existing and planned EV charging locations, and near commercial/retail establishments.
- Active Transportation-15: Work with CCTA to conduct, update, and implement a comprehensive countywide Pedestrian Needs Assessment.
-
- Active Transportation-16: Work with CCTA, local jurisdiction staff from the County, and the cities of Lafayette and Walnut Creek to implement the Olympic Connector Project, to more seamlessly and safely connect the Lafayette-Moraga Trail to the Iron Horse Trail.
- Active Transportation-17: Work with CCTA and local jurisdiction planning and economic development staff to continually partner on increasing active transportation and transportation innovation in new development, with a focus on larger-scale developments that have an opportunity for local conditions of approval that could require improvements to the active transportation network.

- Active Transportation-18: Improve general sidewalk conditions subregion-wide, including, but not limited to:
 - The north side of Willow Pass Road as it crosses under I-680
 - Both sides of Treat Boulevard where the Contra Costa Canal Trail crosses

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Central County Action Plan

Chapter 7: Roadways



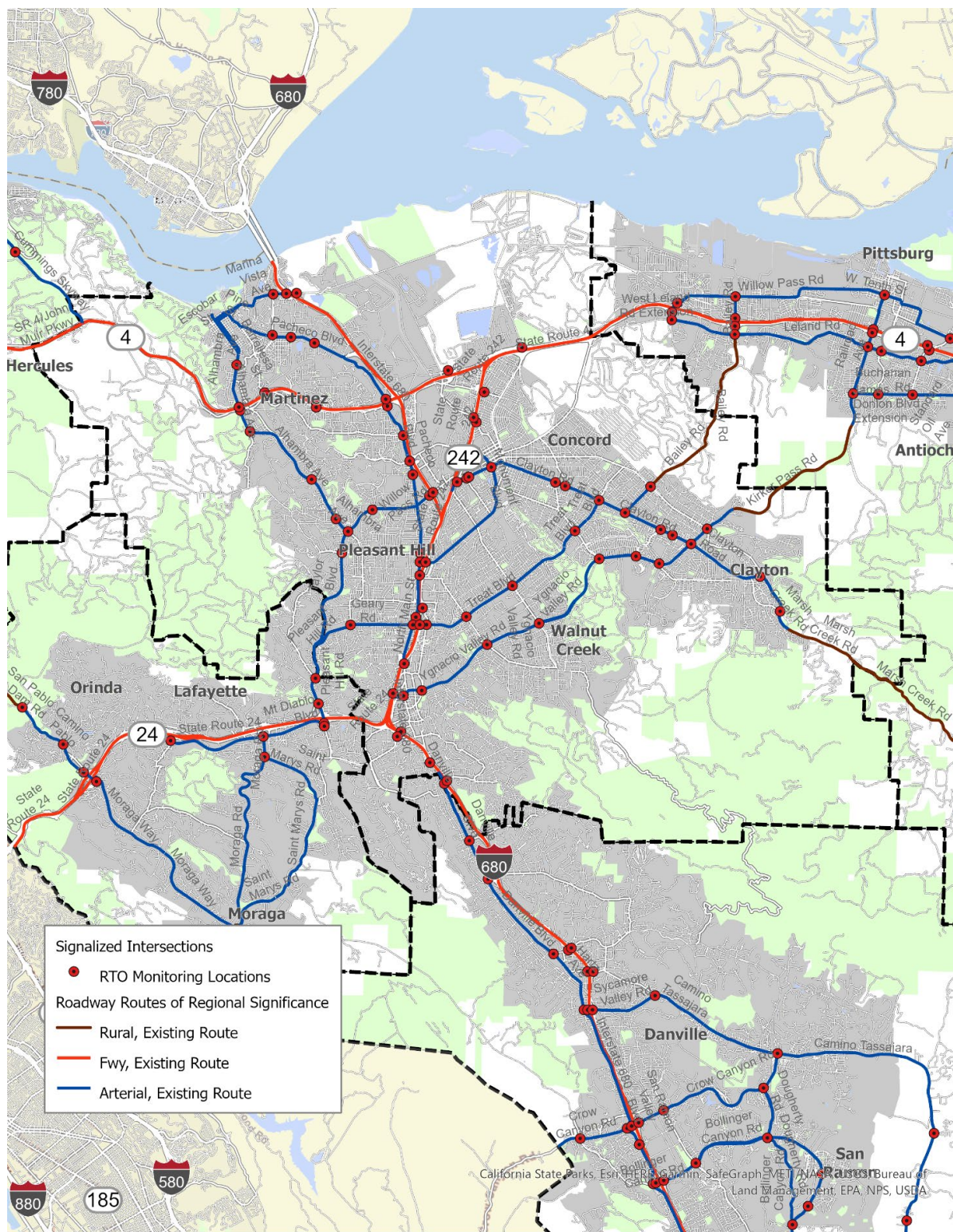
The transportation system in Central County, much like the rest of the United States, is centered around the automobile. While most modes can use them, roadways are primarily geared to the personal automobile and vehicle traffic. This Action Plan monitors Central County roadways and vehicles to ensure service is adequate. However, it is the intention of this Action Plan that the share of personal automobile travel decreases, particularly SOVs, and that Central County roadways become more multimodal over time. Refer to other chapters in this Action Plan to see RTOs and Actions to achieve these goals. It may be the case that some actions in this chapter conflict with the actions in other chapters of this Action Plan. If such a conflict occurs, it will be up to the individual jurisdiction to weigh project or program benefits against one another and the goals of this Action Plan, the subregion, and Central County as a whole. Table 7-1 summarizes roadway RTOs. Figure 7-1 shows the Central County roadway segments and intersections evaluated in this chapter.

Table 7-1: Summary of Roadway Regional Transportation Objectives

RTO Name	Definition	Existing Target	Proposed 2027 Target	Proposed 2050 Target
Roadways RTO-1: Freeway Delay Index	Maintain current delay index	DI≤4.0 (I-680) DI≤3.0 (SR-242) DI≤5.0 (SR-4)	DI≤4.0 (I-680) DI≤3.0 (SR-242) DI≤5.0 (SR-4)	DI≤4.0 (I-680) DI≤3.0 (SR-242) DI≤5.0 (SR-4)
Roadways RTO-2: Freeway Buffer Index	Maintain current buffer index	Buffer index: None	Buffer index: 0.5	Buffer index: 0.5
Roadways RTO-3: Intersection LOS	Maintain LOS at RTO monitoring locations	LOS F at selected intersections, including Geary Road and North Main Street; Treat Boulevard and Geary Road; Treat Boulevard and Bancroft Road; Ygnacio Valley Road and Bancroft Road; Ygnacio Valley Road and Civic Drive	LOS D in all areas except for downtowns, key school sites, and freeway ramps; LOS E at freeway ramps; no LOS standards for downtowns, key school sites, or Transit Priority Areas, or at the following intersections: Geary Road and North Main Street; Treat Boulevard and Geary Road; Treat Boulevard and Bancroft Road; Ygnacio Valley Road and Bancroft Road; Ygnacio Valley Road and Civic Drive	LOS D in all areas except for downtowns, key school sites, and freeway ramps; LOS E at freeway ramps; no LOS standards for downtowns, key school sites, or Transit Priority Areas, or at the following intersections: Geary Road and North Main Street; Treat Boulevard and Geary Road; Treat Boulevard and Bancroft Road; Ygnacio Valley Road and Bancroft Road; Ygnacio Valley Road and Civic Drive
Roadways RTO-4: Roadway Segment LOS	Maintain LOS on two-lane roadways outside of urban areas	None	LOS E (<40 mph)	LOS E (<40 mph)

Note: Refer to the RTO discussions in this chapter for detailed information on existing conditions and explanation of the targets

Figure 7-1: Map of LOS Monitoring Locations and Segments



Freeway RTOs

Freeway RRS in the Central County subregion include:

- I-680 between the Benicia Martinez Bridge and SR-24.
- I-680 from SR-24 to Livorna Road.
- SR-242 between SR-4 and I-680.
- SR-4 from Cummings Skyway to Willow Pass Road.

Roadways RTO-1: Freeway Delay Index

Maintain Peak-Hour Delay Index on Select Freeway Segments

The delay index is a measure of delay experienced by motorists on a roadway segment during a peak commute hour in a single direction. The delay index is calculated by measuring the time it takes to travel a segment of road during peak-period congested conditions and comparing it to the time it takes to travel the same segment during uncongested, free-flow conditions. The delay index may also be calculated as the ratio of congested speed to uncongested speed, given that the distance is fixed on any given corridor.

The observed baseline and modeled results for freeway delay index on the freeway RRS are shown in Table 7-2. As shown, freeway corridors with especially high levels of delay (greater than 1.5 delay index) include I-680 south of SR-24 (northbound in the p.m. and southbound in the a.m.) and SR-242 (northbound in the p.m.), and SR-4 (eastbound in the p.m.). The modeled condition for 2050 shows similar patterns.

Based on current performance and the future modeled performance, this Action Plan proposes the same delay index standards as the 2017 Central County Action Plan, at less than or equal to 4.0 for I-680, less than or equal to 3.0 for SR-242, and less than or equal to 5.0 for SR-4.

Roadways RTO-2: Freeway Buffer Index

Maintain Peak-Hour Freeway Segment Buffer Index on Select Freeway Segments

The buffer index represents the buffer time (or time cushion) that most travelers add to their average travel time when planning trips to ensure on-time arrival. This extra time is added to account for any unexpected delay. The buffer index is expressed as a percentage, and its value increases as reliability gets worse. For example, a buffer index of 40 percent means that, for a 20-minute average travel time, a traveler should budget an additional eight minutes ($20 \text{ minutes} \times 40 \text{ percent} = 8 \text{ minutes}$) to ensure on-time arrival most of the time. In this example, the eight extra minutes are called the buffer time. The buffer index is computed as the difference between the 95th percentile travel time and average travel time, divided by the average travel time.

Observed baseline and modeled results are shown in Table 7-2. The observed buffer index for existing conditions and peak direction of travel ranges from 0.10 to 0.43, reflecting a high degree of travel time variability in some of the corridors.

This Action Plan sets a performance target for the buffer index at 0.50, which means that the extra travel time that must be considered for travelers would be no more than half of the average travel time over the corridor.

For comparison, this section also provides the buffer index for BART trips from the Central County area.

- For an AM peak trip from Walnut Creek BART station to the Montgomery Station in San Francisco, the average trip time is 36 minutes, while 95 percent of trips occur in 39 minutes or less. This means that the buffer time for this BART trip is only three minutes in addition to an average trip time of 36 minutes, which represents a buffer index of 0.08 ($3 \div 36$).
- For a PM peak trip from the Montgomery station in San Francisco to the Walnut Creek BART station, the average trip time is still 36 minutes, while the timing of 95 percent of trips decreases to 38 minutes or less. This means that the buffer time for this BART trip is only two minutes in addition to an average trip time of 36 minutes, which represents a buffer index of 0.05 ($2 \div 36$).
- For an AM trip from the Pleasant Hill BART station to the MacArthur station in Oakland, the average trip time is 20 minutes, while 95 percent of trips occur in 22 minutes or less. This means that the buffer time for this BART trip is only two minutes in addition to an average trip time of 20 minutes, which represents a buffer index of 0.10 ($2 \div 20$).
- For a PM peak trip from the MacArthur station in Oakland to the Pleasant Hill BART station, the average trip time is one minute less at 19 minutes, while 95 percent of trips occur in the same 22 minutes or less. This means that the buffer time for this BART trip is three minutes in addition to an average trip time of 19 minutes, which represents a buffer index of 0.16 ($3 \div 19$).

These buffer indexes for BART are sometimes better than the observed buffer index or the target buffer index for peak-hour, peak-direction trips noted for freeways in this RTO.

Table 7-2: Observed and Baseline Modeled Conditions: Freeways

Route of Regional Significance	2019 Observed			2050	
	Avg Speed (MPH) ^a	Delay Index	Buffer Index	Avg Speed (MPH) ^a	Delay Index
Interstate 680 northbound to State Route 24					
Northbound – a.m.	64.7	1.0	0.06	47.6	1.4
Southbound – p.m.	63.4	1.0	0.29	42.2	1.5
Interstate 680 southbound to State Route 24					
Northbound – a.m.	64.4	1.0	0.06	44.7	1.5
Southbound – p.m.	45.3	1.4	0.29	44.9	1.4
State Route 242					
Northbound – a.m.	63.7	1.0	0.10	58.8	1.1
Southbound – p.m.	64.4	1.0	0.11	51.2	1.3
State Route 4					
Eastbound – a.m.	55.0	1.2	0.36	55.9	1.2
Westbound – p.m.	61.7	1.0	0.11	58.9	1.1

a) MPH = Miles per hour; Average speed over corridor as a whole.

Surface Roadway RTOs

Roadways RTO-3: Intersection LOS

Maintain Peak-Hour LOS at RTO Monitoring Locations in Urban Areas

This RTO is applied to signalized intersections (referred to as RTO Monitoring Locations) along specific defined arterial RRS. Signalized Intersection LOS is a delay-based qualitative measure of traffic conditions at a signalized intersection. LOS is expressed in ratings from A through F, with A meaning that all traffic clears the intersection in every cycle and F meaning that drivers must wait through multiple cycles to clear the intersection. Signalized intersection LOS is determined based on intersection turning movement counts (also called turning/traffic volumes), intersection geometry, and signal timing data. The CCTA Technical Procedures specify that methods documented in the latest edition of the *Highway Capacity Manual* be used to measure signalized intersection LOS.¹⁶ The relationship between average control delay and LOS is shown in Table 7-3, and the RTO Monitoring Locations analyzed for LOS are shown in Table D-1 in Appendix D, Transportation Modeling Results.

¹⁶ The 7th edition of the *Highway Capacity Manual* was published by the Transportation Research Board in January 2022.

Congestion in downtown areas often results from economically and socially positive increased activity, so it is considered acceptable. Congestion at freeway ramps is often unavoidable since large numbers of trips are concentrated in areas where motorists get onto freeways. Therefore, this Action Plan sets performance targets for RTO Monitoring Locations LOS for the Central County subregion as follows:

- LOS D in all areas except downtowns, at key schools, and freeway ramps.
- LOS E at freeway ramps.
- No LOS standard for downtowns, key schools, or Transit Priority Areas, or at the following intersections: Geary Road and North Main Street; Treat Boulevard and Geary Road; Treat Boulevard and Bancroft Road; Ygnacio Valley Road and Bancroft Road; Ygnacio Valley Road and Civic Drive.

Table 7-3: Intersection LOS Definitions

Control Delay (Seconds/Vehicle)	Level of Service (LOS)
≤10	A
>10–20	B
>20–35	C
>35–55	D
>55–80	E
>80	F

Source: *Highway Capacity Manual*, 6th edition, Exhibit 19-8

Roadways RTO-4: Roadway Segment LOS

Maintain Peak-Hour Segment LOS on Selected Two-Lane Roadways Outside of Urban Areas

Roadway segment LOS is a measure of traffic efficiency and smoothness of flow along roadway segments that are not constrained by a nearby traffic signal. This has been calculated in accordance with the methods specified in the 2010 *Highway Capacity Manual* using average speed for Class I highways (Class I highways are two-lane facilities in largely rural areas that motorists expect to traverse at relatively high speed).

For the Central County subregion, this metric is applied to Bailey Road from Concord Boulevard to the RTPC boundary and on Railroad Avenue/Ygnacio Valley Road from Clearbrook Drive to the RTPC Boundary. The segment LOS is related to average speed, as shown in Table 7-4. Table 7-5 lists the two-lane roadway corridors analyzed for the Central County subregion and reports the existing and forecast LOS. Most corridors are forecast to operate under 40 miles per hour (mph) by 2050 with the exception of SR-4.

This Action Plan sets a performance target for this metric at LOS E, which corresponds to speeds of 40 mph or less.

Table 7-4: LOS for Two-Lane Roadways

LOS	Average Speed (MPH)
A	>55
B	>50-55
C	>45-50
D	>40-45
E	≤40
F	>55

Source: Highway Capacity Manual 2010, Exhibit 15-3

MPH = Miles per hour

Table 7-5: Corridor LOS for Two-Way Roadways Outside Urban Areas

Route of Regional Significance	Time of Day	Direction	2019		2050	
			Avg Speed (MPH)	LOS	Avg Speed (MPH)	LOS
Bailey Road	A.M.	EB	32.0	E	33.9	E
Bailey Road	P.M.	EB	34.6	E	8.1	E
Bailey Road	A.M.	WB	40.1	D	8.8	E
Bailey Road	P.M.	WB	39.8	E	31.2	E
Ygnacio Valley Road/Railroad Avenue	A.M.	EB	32.0	E	25.5	E
Ygnacio Valley Road/Railroad Avenue	P.M.	EB	34.6	E	31.2	E
Ygnacio Valley Road/Railroad Avenue	A.M.	WB	40.1	D	11.8	E
Ygnacio Valley Road/Railroad Avenue	P.M.	WB	39.8	E	39.8	E

Source: Inrix Roadway Analytics, CCTA Travel Demand Model

EB = Eastbound, WB = Westbound, MPH = Miles per hour, LOS = level of service

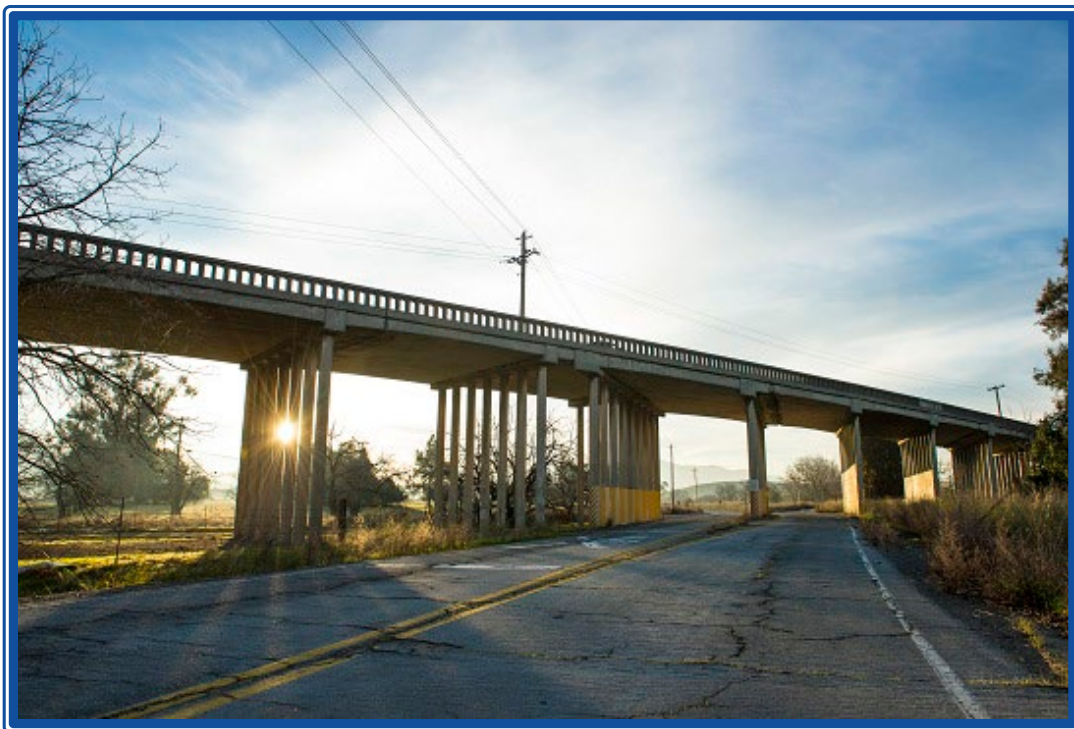
Actions

The following Actions are necessary to achieve the RTO targets and to implement other goals and policies of this Action Plan, the CTP, and other regional long-range planning documents with shared priorities. For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion's incorporated cities and the unincorporated portion of central Contra Costa County. All Actions are enumerated in a summary table in Appendix C, which also lists the responsible agency, partner agencies, and proposed timeline for each Action.

- Roadways-1: Complete necessary operational improvements (e.g., protected turn lanes, synchronized signal timing, auxiliary lanes) on freeways, at intersections, and on roadway segments that are needed to maintain the RTOs in this Action Plan, while ensuring balancing these improvements against the objectives and actions regarding other modes and issues covered by this Action Plan.
- Roadways-2: Work with CCTA and local jurisdictions to complete a continuous high-occupancy vehicle (HOV) system on I-680, including the connection of the SR-4 HOV system to I-680.
- Roadways-3: Work with applicable agencies to support consistent occupancy requirements for toll-free HOV/high-occupancy toll (HOT) lanes on the Benicia-Martinez Bridge and I-680.
- Roadways-4: Improve the operational efficiency of freeways and arterial streets through effective corridor management strategies, such as ramp metering, traffic operations systems, Intelligent Transportation Systems improvements, HOV/HOT lane and bypass lanes, and others to support a cohesive transportation system for all modes.
- Roadways-5: Work with CCTA and local jurisdictions to continue studying the feasibility of pilot and long-term programs for bus on shoulder on Central County freeways.
- Roadways-6: Work with CCTA, Caltrans, and California Highway Patrol to develop a program to track HOV/HOT and toll lane violators.
- Roadways-7: Work with Caltrans and CCTA and local jurisdictions to develop a program to discourage diversion from freeways and cut-through travel on surface roadways by developing traffic management programs, increasing trip capacity on freeways, completing freeway operational improvements, implementing traffic-calming measures on surface roadways, and exploring surface roadway redesign to support active and public transit modes.



- Roadways-8: Work with CCTA to complete a Countywide Goods Movement Plan that promotes greater use of technology for communications and scheduling, funding for equipment upgrades for air quality improvements with cleaner technology, and an advocacy platform for goods movement and guidance for local jurisdictions.
- Roadways-9: Work with CCTA, Caltrans, and other applicable agencies to conduct Integrated Corridor Management (ICM) studies for Central County corridors to improve multimodal function of countywide facilities.
- Roadways-10: Conduct a study to develop a seamless HOV/HOT/Express Lane on SR-24.
- Roadways-11: Develop subregional corridor management plans to provide adequate roadway capacity for local and subregional travel while also including both public and active transportation modes and nonmodal transportation issues, such as equity, climate change, safety, and technology.
- Roadways-12: As part of the CTP process, study roadway improvements along key RRS, to include roadway cross-sections showing changes to lane configurations, sidewalks, bicycle facilities, shoulders, and other roadway components.
- Roadways-13: Explore opportunities to work with LPMC to develop a traffic management program to discourage use of westbound/southbound traffic using Pleasant Hill Road north of SR-24 to bypass the I-680 SR-24 interchange.



Central County Action Plan

Chapter 8: Safety



The safety of the transportation system affects each person that lives, works, or recreates in Central County, regardless of their age or the mode by which they travel. Whether someone is traveling in a vehicle or using active transportation, there is risk of collision on any transportation facility. It is the goal of Central County, in conjunction with many jurisdictions around the world, to eliminate the number of collisions that occur, particularly collisions between vehicles and those using active transportation modes. CCTA has published the *Vision Zero & Systemic Transportation Safety "How To" Policy and Implementation Guide* and encourages local jurisdictions to adopt and implement Vision Zero action plans. In addition, an objective in the 2018 CBPP is to "reduce the rate of pedestrian and bicycle fatalities and injuries per capita." In alignment with the Vision Zero philosophy, this Action Plan sets performance targets at zero fatalities and severe injuries for all collisions. See Table 8-1 for a summary of safety RTOs.

Table 8-1: Summary of Safety Regional Transportation Objectives

RTO Name	Definition	Existing Target	Proposed 2027 Target	Proposed 2050 Target
Safety RTO-1: KSI Collisions	Eliminate collisions that result in fatality or severe injury	None	Zero fatality and severe injury collisions ^a	
Safety RTO-2: Active Transportation Collisions	Eliminate collisions involving users of active transportation	None		
Safety RTO-3: Active Transportation Collisions near Schools ^b	Eliminate active transportation-involved collisions occurring within 500 feet of schools	None		

a) CCTA codified Vision Zero work through Resolution 21-40-G which adopts the Contra Costa Countywide Transportation Safety Policy and Implementation Guide for Local Agencies.

b) Schools in this analysis refer to all public and private grade K-12 schools.

Note: Refer to the RTO discussions in this chapter for detailed information on existing conditions and explanation of the targets

RTOs

The RTOs in this section are based on the injury and fatality collisions reported by the Transportation Injury Mapping System (TIMS).¹⁷ TIMS collision records represent cleaned and geocoded data compiled by the Statewide Integrated Traffic Records System maintained by the California Highway Patrol. The statistics reflect the most recent complete four years of available data but exclude data from 2020 due to pandemic conditions. Therefore, TIMS data used in this Action Plan include January 1, 2016, through December 31, 2019. CCTA and the Central County jurisdictions understand that there have been collisions since this time and that they may occur in locations that are not captured in these point-in-time data. However, these data are intended to be a sampling and do not represent all KSI collisions. The number of collisions reported in this chapter are recognized to represent an undercount of total collisions because not all collisions, especially minor ones, are reported to the police.



¹⁷ Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley, 2022.

Safety RTO-1: KSI Collisions

Eliminate Killed or Severely Injured Collisions in the Subregion

This RTO tracks the number of severe injury or fatality collisions from the TIMS data set between the years of 2016 and 2019.¹⁸ This RTO includes all collisions that occur in the subregion and not exclusively collisions between vehicles and bicycles and pedestrians. The collision locations are depicted on Figure 8-1 and Table 8-2 summarizes the collisions by type.

Between 2016 and 2019, there were 439 severe injury or fatality collisions throughout Central County—84 fatal collisions and 355 severe injury collisions. The most common types of collision were cars hitting objects and vehicle/pedestrian.

Safety RTO-2: Active Transportation Collisions

Eliminate Collisions in the Subregion that Involve Users of Active Transportation

This RTO tracks the number of bicycle- or pedestrian-involved collisions from the TIMS data set. The collision locations for the Central County subregion are depicted on Figure 8-1 and summarized by severity in Table 8-3. During this time frame, there were 700 bicycle- or pedestrian-involved collisions, accounting for 12 percent of all injury and fatality collisions. Of the bicycle or pedestrian collisions, 30 resulted in fatalities and 99 resulted in severe injury.



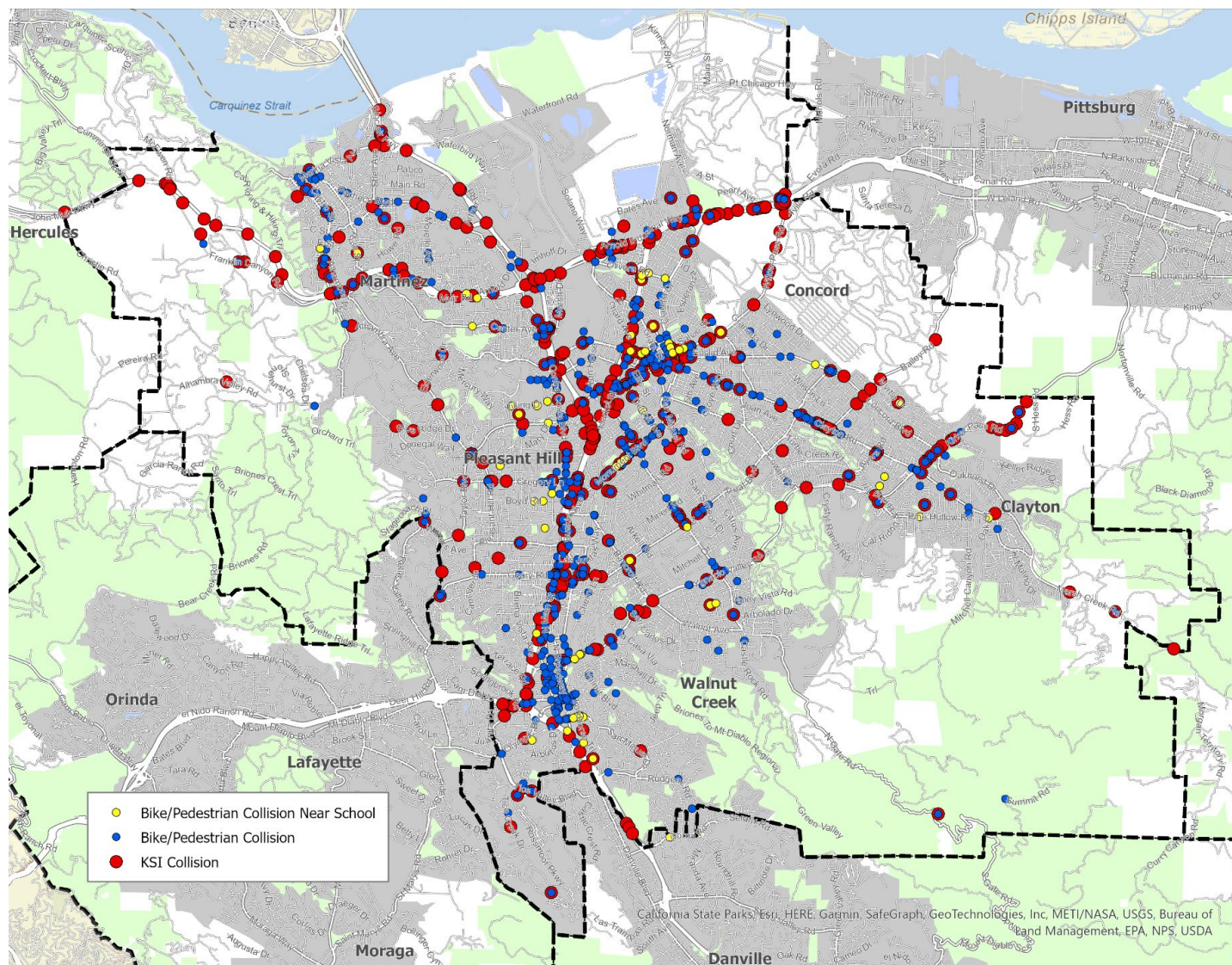
Safety RTO-3: Active Transportation Collisions Near Schools

Eliminate Active Transportation Collisions Within 500 Feet of a School

This RTO tracks the number of active transportation-involved collisions that occur within 500 feet of school campuses. These collision locations are also depicted on Figure 8-1. A total of 68 collisions occurred near school campuses, 39 of which involved collision with a pedestrian and 29 with a bicyclist, including one that involved both a pedestrian and bicyclist. These collisions also include three fatal collisions.

¹⁸ This Action Plan uses a collision data timeframe of four years due to skewed data in 2020 from the COVID-19 pandemic.

Figure 8-1: KSI and Active Transportation-Involved Collisions (2016-2019)¹⁹



¹⁹ Note that KSI collisions involving a bicycle or pedestrian are shown with both a blue and red dot.

Table 8-2: KSI Collisions by Type: Central County Subregion, January 1, 2016, through December 31, 2019

Collision Type	2016	2017	2018	2019	Number of Collisions
Not Stated	1	3	2	1	7
Head-on	10	17	13	6	46
Sideswipe	5	14	13	8	40
Rear-End	9	10	23	19	61
Broadside	13	21	19	28	81
Hit Object	24	16	21	27	88
Overtaken	5	11	10	10	36
Vehicle/Pedestrian	18	19	10	27	74
Other	1	1	1	3	6
Total	86	112	112	129	439

Source: Transportation Injury Mapping System and DKS Associates.

Table 8-3: Active Transportation Collisions by Severity: Central County Subregion, January 1, 2016, through December 31, 2019

Severity of Injury	2016	2017	2018	2019	Total Bicycle and Pedestrian Collisions
Fatal	9	8	4	9	30
Injury (Severe)	19	28	25	27	99
Injury (Other Visible)	71	62	71	63	267
Injury (Complaint of Pain)	87	81	67	69	304
Total	186	179	167	168	700

Source: Transportation Injury Mapping System and DKS Associates.

Actions

The following Actions are necessary to achieve the RTO targets and to implement other goals and policies of this Action Plan, the CTP, and other regional long-range planning documents with shared priorities. For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion's incorporated cities and the unincorporated portion of central Contra Costa County. All Actions are enumerated in a summary table in Appendix C, which also lists the responsible agency, partner agencies, and proposed timeline for each Action.

- Safety-1: Work with CCTA to implement the Countywide Vision Zero Framework and Safe System Approach to project scoping and delivery.
- Safety-2: Conduct a study to identify all safety-related transportation improvements needed within 500 feet of schools.
- Safety-3: Develop a program to coordinate the collection and analysis of safety data, identify areas of concern, and propose safety-related improvements and user awareness to support countywide, state, and federal safety programs and performance measures.
- Safety-4: Work with CCTA, MTC, and East Bay Regional Parks District (EBRPD) to study and mitigate the safety impacts of electric bicycles and other micro-mobility devices on local trails and streets, with the aim of eventually allowing electric bicycles, e-scooters, and other micro-mobility devices on all of these facilities.
- Safety-5: Improve the safety of high-incident local roadways through physical changes, signage, technology, education, enforcement, or other tools.
- Safety-6: Work with regional and local agencies to increase the level of multimodal public awareness and empathy about bicycle and pedestrian safety and to reduce injuries due to vehicle-involved collisions.

Project Highlight!

The East Bay Regional Parks District Board of Directors approved a one-year pilot program in 2017 to allow e-bicycles on three regional trails.



Central County Action Plan

Chapter 9: Equity



All members of the Central County community should have equal access to various transportation options, jobs, and services. The Central County subregion has several EPCs whose residents are documented to have lower socioeconomic status than the Bay Area as a whole. Therefore, this Action Plan looks at several components of the transportation system in terms of access to mobility, jobs, and services. See Table 9-1 for a summary of equity RTOs.

Table 9-1: Summary of Equity Regional Transportation Objectives

RTO Name	Definition	Existing Target	Proposed 2027 Target	Proposed 2050 Target
Equity RTO-1: EPC Low-Stress Bicycle Network	Proportion of the LSBN that is complete in EPCs, as compared to Central County as whole	None	Increase level of LSBN completion to match or exceed that of Central County as a whole	
Equity RTO-2: Collisions in EPCs	Proportion of KSI collisions that occur in EPCs, as compared to Central County as whole	None	Decrease collision rates to match Central County as whole	
Equity RTO-3: EPC Job Access: Driving	Share of jobs accessible by EPCs residents with a 30-minute drive, as compared to Central County as whole	None	Increase job access to match Central County as a whole	
Equity RTO-4: EPC Job Access: Transit	Share of jobs accessible by EPCs residents with a 45-minute transit trip, as compared to Central County as whole	None	Increase job access to match or exceed that of Central County as a whole	
Equity RTO-5: EPC Access to High-Quality Transit	Total number of EPC acres within a high-quality transit buffer, as compared to Central County as whole	None	Increase access to high quality transit to match or exceed that of Central County as a whole	

Note: Refer to the RTO discussions in this chapter for detailed information on existing conditions and explanation of the targets

RTOs

Equity RTO-1: EPC Low-Stress Bicycle Network Completion

Ensure that the proportion of the Countywide LSBN that has been completed in EPCs is Equal to or Greater than the proportion completed in the Subregion as a Whole

The status of the entire Central County portion of the LSBN is shown on Figure 9-1. If the entire LSBN in the Central County subregion were completed, it would result in 178.2 miles of Class I, Class IIIB, or Class IV facilities.

Table 9-2 breaks down the portions of the LSBN that are at varying stages of completeness in both the entire subregion and in EPC areas. Table 9-2 shows that 23 percent of the LSBN is already complete in the entire subregion, with a slightly smaller portion, 20 percent, completed in EPCs. A larger proportion of the LSBN has a project planned and/or funded to complete a low stress facility, with 25 percent in EPCs compared to 12 percent subregion-wide. The case is opposite for portions of the LSBN in EPCs that have a non-low stress facility planned and/or funded—two percent in EPCs compared to five percent subregion-wide. EPC areas have a further 25 percent of the LSBN under study, and the entire

subregion has two percent under study. The proportion of the LSBN with no low stress facility planned or under study is higher for EPCs than the subregion—57 percent subregion-wide compared to 28 percent in EPCs. Therefore, the entire subregion as a whole is better off in terms of having LSBN projects planned and/or funded and having other active transportation improvements (non-low stress) proposed or under study.

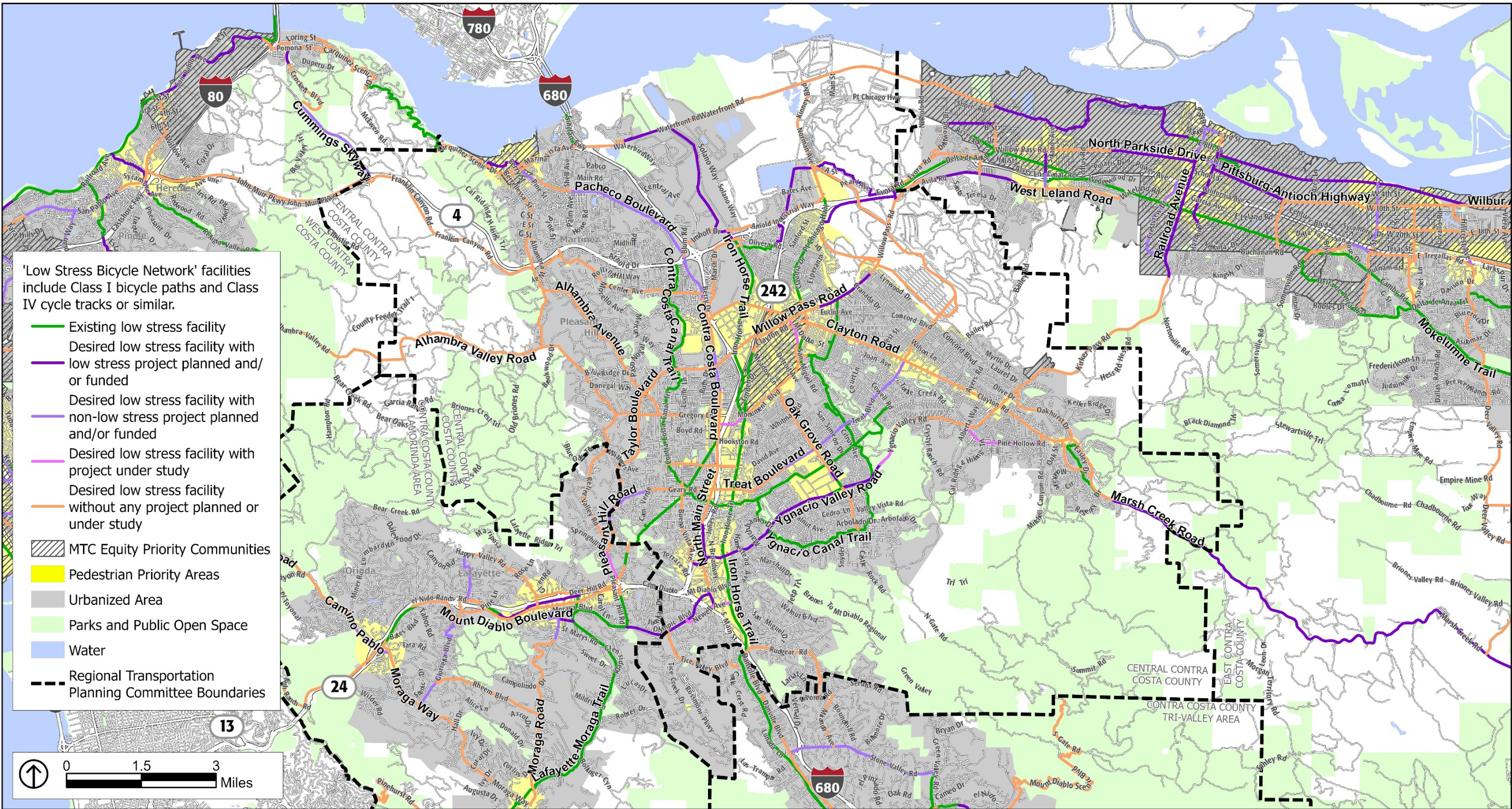
This Action Plan sets a performance target for the subregion that the amount of LSBN network complete should meet or exceed that of the entire subregion. As shown in Table 9-2 and described above, Central County EPCs already fare better than non-EPCs in planned and/or funded projects but are generally less complete than in the entire subregion.

Table 9-2: Proportion of the Central County LSBN That Is Complete in EPCs

Status of Facility	Entire Subregion Miles	Entire Subregion Percentage	Central County EPC Miles	Central County EPC Percentage
Existing Low-Stress Facility	40.3	23%	2.4	20%
Desired Low-Stress Facility with Low Stress Project Planned and/or Funded	21.5	12%	3	25%
Desired Low-Stress Facility with Non-Low Stress Project Planned and/or Funded	9.6	5%	0.2	2%
Desired Low-Stress Facility with Project Under Study	4.4	2%	2.9	25%
Desired Low-Stress Facility without any Project Planned or Under Study	102.4	57%	3.4	28%

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Figure 9-1: Central County Low-Stress Bicycle Network in EPCs



Source: ABAG/MTC, 2021, 2019; CCTA, 2022; ESRI, 2021; PlaceWorks, 2022.

Note: The status of specific segments on this map is taken from the CCTA 2018 Countywide Bicycle and Pedestrian Plan (CBPP) project list, the revised 2022 CBPP project list, adopted Bicycle and Pedestrian Master Plans from individual jurisdiction, and consultation with local staff. “Desired Low Stress Network” refers to what the entire Low Stress Bicycle Network would look like upon completion, per the 2018 CBPP.

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Equity RTO-2: Collisions in EPCs

Ensure that the Proportion of KSI and Active Transportation-Involved Collisions in EPCs in the Subregion is Equal to or Less than the Proportion of the Subregion's Population Living in EPCs

This metric tracks the rate of collisions that occur within EPCs compared to the rate for the entire Central County subregion. The intention of this RTO is that the rate of KSI and active transportation-involved collisions is not more concentrated in EPCs than in non-EPC areas. Tracking this information allows CCTA, TRANSPAC, and Central County jurisdictions to evaluate any infrastructure or other improvements that may need to be made to increase safety in EPCs. As shown in Table 9-3, the collision rates in EPCs in Central County are far higher (1.38 collisions per 1,000 population) than the rate in Central County as a whole (0.34 collisions per 1,000 population). The overall goal of this RTO is to ensure that this disparity in collision rates between EPCs and non-EPCs does not exist. As identified in Chapter 8, this Action Plan adopts targets of zero KSI or active transportation-involved collisions in Central County, congruent with Vision Zero initiatives. Therefore, the implied goal of Equity RTO-2 is that there are also zero KSI or active transportation-involved collisions in Central County EPCs. Actions in this plan are intended to improve roadway safety in Central County's EPCs to address this disparity.

Table 9-3: KSI and Active Transportation-Involved Collision Rates

Collision Type	Number of Collisions (2016-2019)		2019 Population ^a		Avg. Annual Collisions (1,000s) per Population	
	Central County	Central County EPCs	Central County	Central County EPCs	Central County	Central County EPCs
KSI	439	52	324,340	9,453	0.34	1.38
Active Transportation-Involved	700	133	324,340	9,453	0.54	3.52

a) Population from American Community Survey 2019 Five Year Estimates Table B01003.

Equity RTO-3: EPC Job Access: Driving

Ensure that the Number of Jobs that Can be Reached by EPC Residents with a 30-Minute Drive is Equal to or Greater than the Number of Jobs that Can be Reached with a 30-Minute Drive by All Residents in the Subregion

This metric conveys the average number of jobs per capita within a 30-minute peak period drive for all Central County TAZs compared to all TAZs within Central County EPCs. The number of jobs corresponds to those used in the travel demand model demographic inputs. As shown in Table 9-4, within a 30-minute drive, there are on average 268 accessible jobs per Central County subregion resident and 252 accessible jobs per Central County subregion resident within an EPC. By 2050, the averages are projected to decline to 248 and 239, respectively. This means that there was an average of 16 fewer jobs per capita accessible by driving to Central County residents that live inside of an EPC

in 2019 when compared to Central County as a whole. Projections for 2050 predict that this gap will narrow, and EPC residents will end up with nine more jobs per capita accessible by a 30-minute drive than those living in Central County as a whole.

The Action Plan sets a performance target for this RTO that the average number of jobs per capita within the EPCs that are accessible by a 30-minute drive should be at least equivalent to that for the subregion as a whole. As noted, this target is not currently being met, but it is predicted to be met by 2050.

Table 9-4: Average Auto-Accessible Jobs per Capita (30-Minute Drive)

Geography	2019 Average Jobs per Capita	2050 Average Jobs per Capita
Central Subregion	268	248
Central Subregion EPCs	252	239

Equity RTO-4: EPC Job Access: Transit

Ensure that the Number of Jobs that Can be Reached by EPC Residents with a 45-Minute Transit Trip is Equal to or Greater than the Number of Jobs that Can be Reached with a 45-Minute Transit Trip by All Residents in the Subregion

This metric conveys the average number of jobs per capita within a 45-minute peak period transit ride for all Central County TAZs compared to all TAZs within Central County EPCs. The number of jobs corresponds to those used in the travel demand model demographic inputs. As shown in Table 9-5, there are, on average, 470 jobs per Central County resident and 365 jobs per Central County resident within an EPC that are accessible with a 45-minute transit ride. By 2050, the averages are projected to decrease to 374 and 301, respectively. This means that less jobs are already accessible via a 45-minute transit ride for EPC residents than is the case for Central County residents as a whole.

This Action Plan sets a performance target for this RTO that the average number of jobs per capita within a 45-minute transit ride for EPC residents should be at least equivalent to that of the subregion and to maintain it through 2050.

Table 9-5: Average Transit Accessible Jobs per Capita (45-Minute Ride)

Geography	2019 Average Jobs per Capita	2050 Average Jobs per Capita
Central Subregion	470	374
Central Subregion EPCs	365	301

Equity RTO-5: EPC Access to High-Quality Transit

Ensure that the Proportion of Urbanized EPC Land Area in the Subregion Served by High-Quality Transit is Equal to or Greater than the Urbanized Land Area Served by High-Quality Transit in the Subregion as a Whole

As shown on Figure 9-2 and in Table 9-6, 66 percent of EPC areas in Central County are not within a quarter mile of high-frequency bus stops with 15-minute headways or less, or within a half mile of rail or ferry terminals. Table 9-6 indicates that only 34 percent of EPC acreage is within the high-quality transit buffer. However, this figure is significantly better when compared to the urbanized portions of Central County as a whole, which have 11 percent of their land area with access to high-quality transit. High-quality transit is more accessible (by 23 percent) in EPCs than in Central County as a whole.

The Action Plan sets a performance target that the subregion should aim to maintain EPC access to high-quality transit at or above the levels that exist for Central County as a whole.

Table 9-6: Central County EPC Acres in Relation to High-Quality Transit

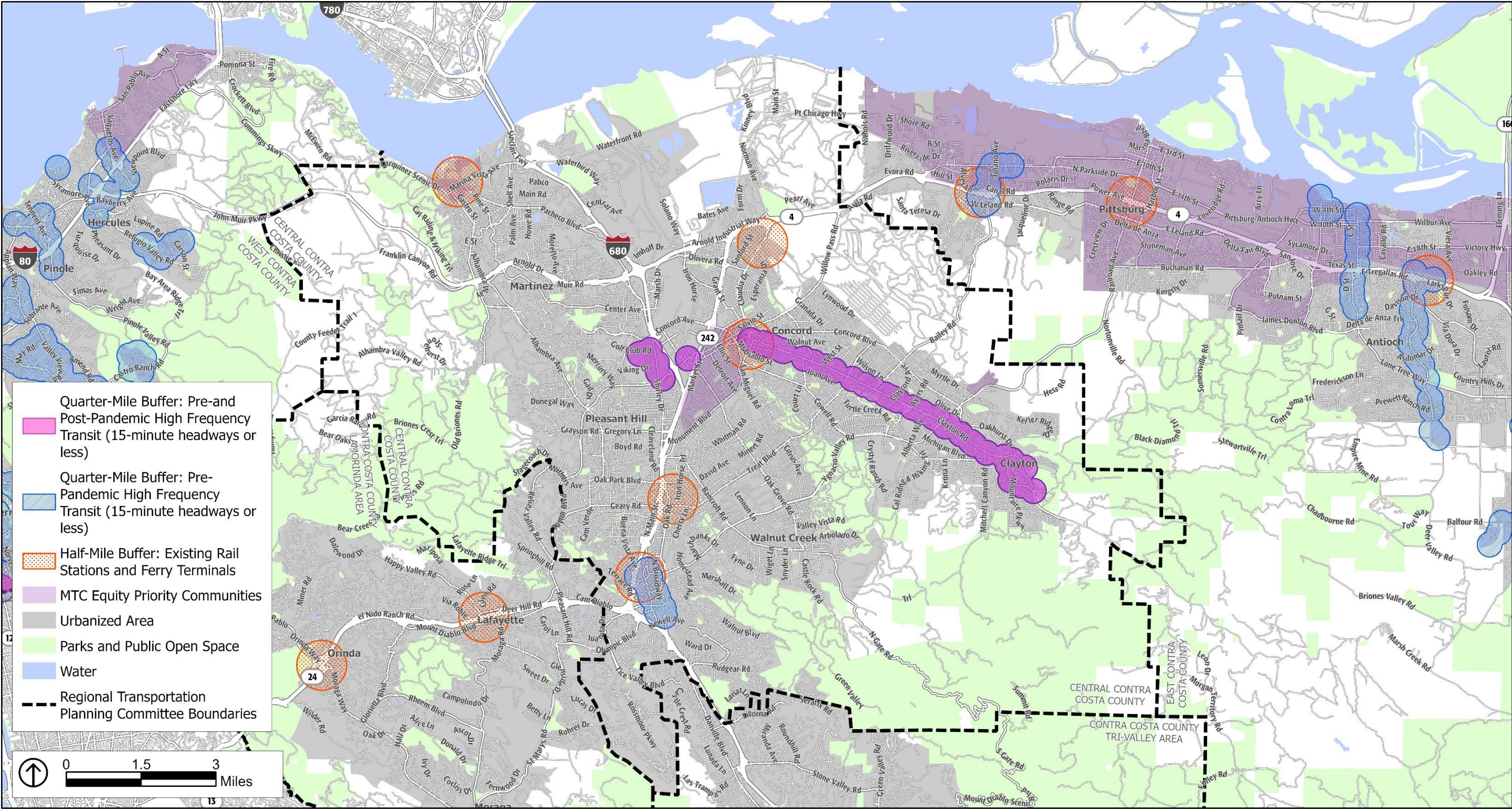
	Non-EPC Acres	Proportion of Non-EPC Acres	Central County EPC Acres	Central County Proportion of Total EPC Acres
Within high-quality transit buffer	5,281	11%	497	34%
Not within high-quality transit buffer	44,964	89%	949	66%
Total acres	50,245	100%	1,446	100%

All figures are for urbanized areas only



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Figure 9-2: Central County EPCs and High-Quality Transit



Source: CCTA, 2021; ESRI, 2021; PlaceWorks, 2022.

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Actions

The following Actions are needed to achieve the RTO targets and to implement other goals and policies of this Action Plan, the CTP, and other regional long-range planning documents with shared priorities. For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion's incorporated cities and the unincorporated portion of central Contra Costa County. All Actions are enumerated in a summary table in Appendix C, which also lists the responsible agency, partner agencies, and proposed timeline for each Action.

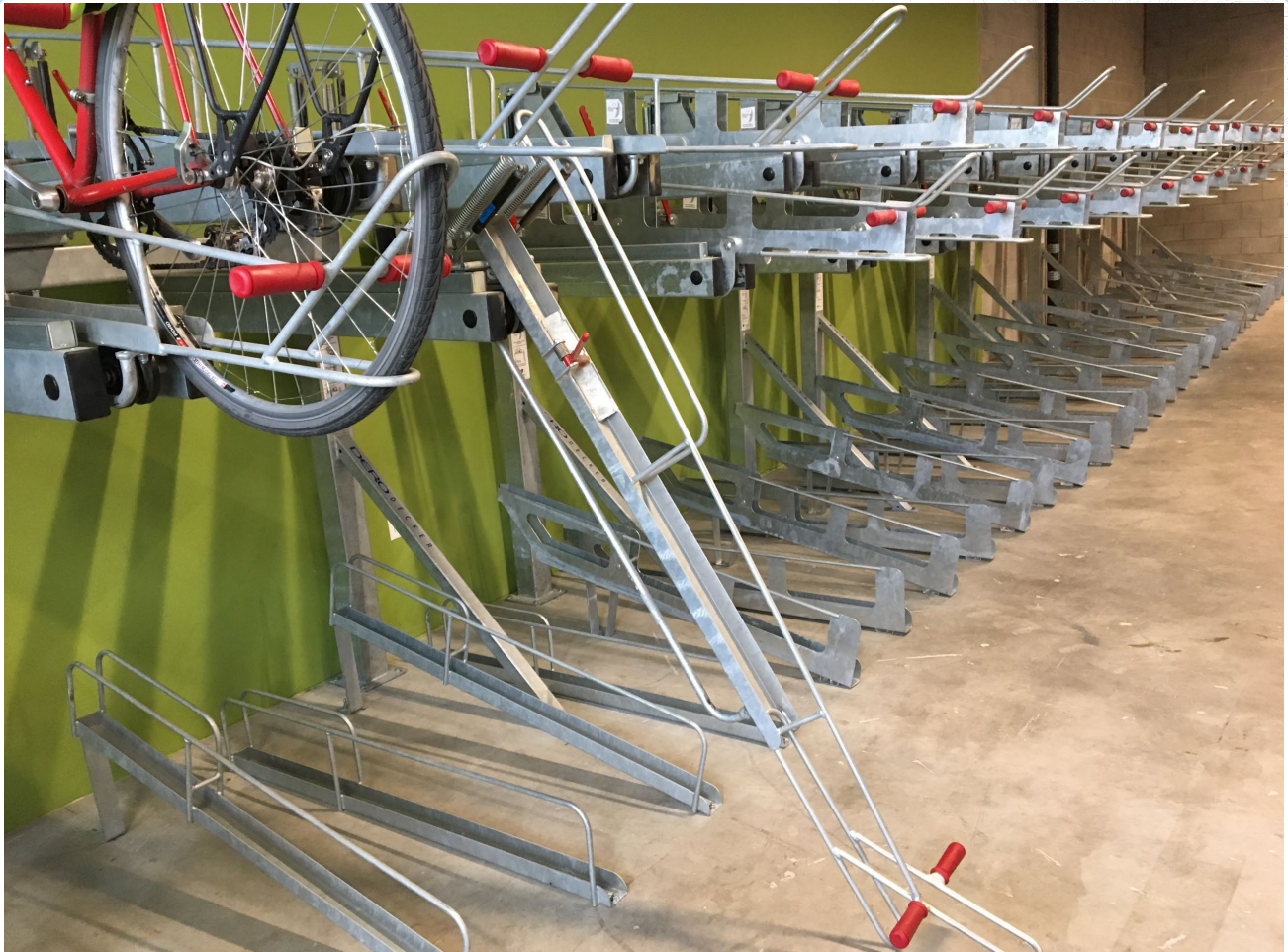
- Equity-1: Conduct a study to identify strategies to increase low-income resident access to transit hubs, jobs, and areas with goods and services (for example, in Central County, the study could explore enhancing existing transit hubs, constructing new transit hubs, and first/last mile solutions).
- Equity-2: Increase access to car-sharing services for low-income residents and support financial incentives for using them.
- Equity-3: Increase express bus service to regional job centers, particularly those with low-income workers, inside and outside of the subregion.
- Equity-4: Increase high-frequency transit lines and stops in EPC areas.
- Equity-5: Conduct a study of locations where there is a concentration of KSI collisions in EPCs to identify needed safety improvements and then implement the identified improvements.



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Central County Action Plan

Chapter 10: Climate Change



As described in Chapter 2, climate change is a significant challenge facing humans and the planet, and transportation is one of the largest contributors of GHG emissions. The transportation system not only contributes to climate change, but is vulnerable to its impacts, such as extreme weather and sea level rise. This chapter includes several RTOs aimed at reducing the impact that the transportation system has on climate change. See Table 10-1 for a summary of climate change RTOs.

Table 10-1: Summary of Climate Change Regional Transportation Objectives

RTO Name	Definition	Existing Target	Proposed 2027 Target	Proposed 2050 Target
Climate Change RTO-1: Single-Occupant Vehicle (SOV) Mode Share	Decrease SOV mode share per capita	None	72% for commute trips	57% for commute trips
Climate Change RTO-2: Carpool Mode Share	Increase carpool mode share	None	13% for commute trips	20% for commute trips
Climate Change RTO-3: Vehicle Miles Traveled	Decrease VMT per capita	None	26.6 VMT	21 VMT
Climate Change RTO-4: Greenhouse Gas Emissions	Decrease GHG emissions per capita	None	17 lbs per capita	Zero transportation related
Climate Change RTO-5: Zero-Emission Vehicles	Increase registered electric vehicles	None	50% of total market share	100% of total market share

Note: Refer to the RTO discussions in this chapter for detailed information on existing conditions and explanation of the targets

RTOs

Climate Change RTO-1: SOV Mode Share

Reduce the Mode Share of SOVs in the Subregion

As shown in Table 2-2 in Chapter 2, in 2019, 72 percent of total Central County work trips were by SOVs, which is the same percentage of total Contra Costa work trips. These figures are projected to decrease on their own through 2050 to 70 percent.

This Action Plan sets a performance target for SOV commute mode share in the Central County subregion—to match pre-pandemic levels of 72 percent by 2027 and to decrease SOV commute mode share to 57 percent by 2050. These numbers have been derived by reducing future SOV mode share by the targeted increases in transit and active transportation mode share, and by assuming an increase in carpooling (multiple-occupant vehicle) mode share to 20 percent by 2050.



Climate Change RTO-2: Carpool Mode Share

Increase the Mode Share of Carpooling in the Subregion

As discussed previously, reducing SOV mode share will require increases in the other modes, including carpooling. As shown in Table 2-2 in Chapter 2, in 2019, 13 percent of Central County residents commuted to work via carpooling, compared to 14 percent of countywide commute trips. These figures are projected to stay the same for central County trips and to increase by one percent for countywide trips. This Action Plan sets a target of 13 percent of commute trips to be made by carpooling by 2027 to match pre-pandemic levels. This Action Plan also adopts a target of 20 percent of work trips taken by carpool by 2050.

Climate Change RTO-3: Vehicle Miles Traveled

Reduce Vehicle Miles Traveled per Service Population in the Subregion

This Action Plan considers total VMT for county and subregion residents. The 2020 VMT study conducted for CCTA by consultant Fehr & Peers found that 2018 VMT per service population in the Central County subregion was 29.4, and for Contra Costa County was 30.3 VMT per service population.

The California Air Resources Board's *2017 Scoping Plan: Identified VMT Reductions and Relationship to State Climate Goals*²⁰ states that California needs to reduce daily per-capita VMT to 21 to achieve carbon neutrality, which is the State's goal for 2045. Based on this recommendation, this Action Plan sets a goal for 2050 to reduce VMT per service population to 21 VMT per service population in the Central County area. Using a straight-line projection for reductions from 2018 to 2050, this would mean a reduction to 26.6 VMT per capita by 2027.

Table 10-2: VMT per Service Population

	2018 Existing	2027 Target	2050 Target
Central County	29.4	26.6	21
Contra Costa County	30.3		

Sources: Fehr and Peers, 2020; DKS and CCTA Travel Demand Model, 2022.

Climate Change RTO-4: Greenhouse Gas Emissions

Reduce Transportation Greenhouse Gas Emissions per Capita in the Subregion

This metric reflects the total daily VMT occurring on roadways within the Central County area, including commercial vehicle trips and through traffic, but does not include estimates of VMT occurring outside

²⁰ California Air Resources Board, *2017 Scoping Plan: Identified VMT Reductions and Relationship to State Climate Goals*, January 2019, https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf.

the travel demand model boundaries. The EMFAC emissions model has been used to translate this total daily roadway VMT into GHG emissions (specifically, carbon dioxide [CO₂]).²¹ The emissions outputs also reflect assumptions about the future vehicle fleet.

The target for this metric is zero tons of transportation related emissions by 2050 or about a one-third reduction in GHG per capita by 2027.²² With the currently estimated 26 pounds of GHG per capita, this translates to a 2027 target of about 17 pounds per capita. Although transportation-related CO₂ emissions are projected to fall by 2050 (see Table 10-3), more work is needed to reach the target of zero.

Table 10-3: Average Daily Transportation-Related GHG per Capita

	2019			2050 ^a		
	Population	CO ₂ Emissions (Tons)	CO ₂ Emissions Per Capita (Lbs)	Population	CO ₂ Emissions (Tons)	CO ₂ Emissions Per Capita (Lbs)
Central County	318,611	4,153	26.1	411,543	2,647	12.4
Contra Costa County	1,148,922	13,734	23.9	1,457,615	8,737	11.9

Sources : DKS Associates ; EMFAC 2021 ; CCTA Travel Demand Model.

a) 2050 data in this table reflect projected CO₂ emissions in 2050 assuming that the Action Plan is not implemented.

Climate Change RTO-5: Zero-Emission Vehicles

Increase the Share of Zero-Emission Vehicles in the Subregion

This RTO tracks the number of battery electric vehicles “on the road,” with the goal of increasing total EV market share. Data as of April 2021, the most recent report date, are shown in Table 10-4 for Central County as well as all of Contra Costa County for comparison. Central County currently has 4,879 EVs, making up two percent of total registered vehicles in the subregion.

Under a regulation approved by the California Air Resources Board, 35 percent of new passenger vehicles sold in the state must be powered by batteries or hydrogen by 2026, and 100 percent by 2035.²³ As of December 2022, 12.4 percent of new vehicles sold in California are ZEVs, and ZEVs make up about two percent of the light-duty vehicle fleet in Contra Costa County.

²¹ California Air Resources Board, EMFAC, v1.0.2, Scenario Analysis, 2021.

²² This target decrease was estimated using a one-third reduction when assuming 30 years of implementation over the life of the Action Plan.

²³ California Air Resources Board, Advanced Clean Cars II.

By Executive Order, California has set a target of one million ZEVs on the road by 2025 and five million ZEVs by 2030.²⁴ Since Central County accounts for about less than one percent of the state's population, this suggests that the subregion should have about 8,100 ZEVs by 2025 and 40,600 ZEVs by 2030. A straight-line extrapolation of this number through 2050 suggests about 191,000 ZEVs in Central County by 2050.

With all these factors in mind, this Action Plan sets a target of 100 percent of the fleet (vehicles on the road), contrasted to the estimated existing EV fleet penetration of about two percent. The estimated number of light-duty vehicles currently based in Central County is about 247,807 (see Table 10-4).



Table 10-4: Electric Vehicles by Subregion as of April 2021

Area	Battery Electric Vehicles ^a	Total Vehicles	Percentage Battery Electric
Central County	4,879	247,807	2%
East County	2,926	264,910	1.1%
Lamorinda	3,141	51,896	6.1%
Tri-Valley ^b	15,262	315,590	4.8%
West County	4,258	217,792	2%
Countywide Total	21,609	1,097,995	2.8%

Source: California Energy Commission (2022). California Energy Commission Zero Emission Vehicle and Infrastructure Statistics. Data last updated April 2022. Retrieved June 29, 2022, from <http://www.energy.ca.gov/zevstats>.

Note: Correspondence of zip codes to RTPC boundaries is approximate.

a) A Battery Electric Vehicle is a vehicle that can operate, partially or entirely, on chemical energy stored in rechargeable battery packs.

b) Includes both the Contra Costa and Alameda County portions of the Tri-Valley.

²⁴ Executive Order B-16-2012 and Executive Order B-48-18.

Actions

The following Actions are necessary to achieve the RTO targets and to implement other goals and policies of this Action Plan, the CTP, and other regional long-range planning documents with shared priorities. For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion's incorporated cities and the unincorporated portion of central Contra Costa County. All Actions are enumerated in a summary table in Appendix C, which also lists the responsible agency, partner agencies, and proposed timeline for each Action.

- Climate Change-1: Work with the 511 Contra Costa to continually expand and improve TDM Programs to educate and encourage Contra Costa residents, students, and commuters to use multimodal alternatives by promoting transit, shuttles, carpooling, vanpooling, walking, bicycling, alternative work schedules, and telecommuting.
- Climate Change-2: Work with regional agencies, local employers, and schools to increase remote work opportunities, compress work weeks, alternative work location, and flex schedules, and provide pre-tax employer transportation benefit programs.
- Climate Change-3: Continue to implement a program to support deployment of high-quality, fast, and diverse EV chargers in the subregion.
- Climate Change-4: Continue to promote EV ownership by offering financial incentives and providing educational programs and demonstrations.
- Climate Change-5: Coordinate with impacted jurisdictions, property owners, and other applicable agencies that own or maintain RRS that would be impacted by sea level rise, to coordinate and plan for inundation mitigation.
- Climate Change-6: Encourage regional agencies and local jurisdictions to refer to the Adapting to Rising Tides Adaptation Roadmap when planning for sea level rise.
- Climate Change-7: Adopt local policies that prioritize mobility for GHG-reducing modes of transportation.

511 Contra Costa

511 Contra Costa is a countywide transportation demand management program that strives to reduce traffic congestion and improve air quality through public education, resources, and tools that promote mobility options other than solitary driving. Some of its incentives and programs are Safe Routes to School, E-bike Rebates, Guaranteed Rides Home, and Free Bus Pass for Students. In 2021, 511 Contra Costa helped eliminate 50 million pounds of pollution by shifting drive-alone trips to transit, shared rides, biking, and walking.

Central County Action Plan

Chapter 11: Innovation and Technology



As discussed in Chapter 2, innovation and technology, coupled with current projects and programs, will reduce congestion, improve air quality, and provide new mobility options for all Central County residents. RTOs and actions in this chapter are created to ensure that CCTA and Central County jurisdictions are leveraging various transportation technologies and will adopt new ones as they emerge to ensure the region stays at the forefront of technological innovation in the transportation system. New technology can be difficult to track because there are so many unknowns, so this Action Plan only includes one Innovation and Technology RTO (see Table 10-1).

However, several actions are in this chapter to ensure that innovation and technology are key components of the work that will be implemented for the Action Plan, with the ultimate goal of expanding Innovation and Technology RTOs in the next Action Plan update.

Automated Vehicles

Although it is not yet available to all consumers, full vehicle autonomy could increase safety by removing human error that can lead to a collision and by detecting an oncoming threat faster than a human. Other anticipated benefits of automated vehicles are increased accessibility for underserved communities, reduced demand for parking space when used for shared mobility, and reduced traffic through improved communication technology like Connected Autonomous Vehicles (CAVs).

Table 11-1: Summary of Innovation and Technology Regional Transportation Objective

RTO Name	Definition	Existing Target	Proposed 2027 Target	Proposed 2050 Target
Innovation and Technology RTO-1: Signal Interconnection Project ^a	Increase connected signals	None	Complete Signal Interconnection Project	None

a. The CCTA Signal Interconnection Project is currently underway. Traffic signals for interconnection will be determined after publication of the Action Plan. The project is scheduled to be completed by 2027. Therefore, there are no signal interconnections proposed after 2027 unless identified later on through the project. Future interconnection may be determined in the next Action Plan update process.

Refer to the RTO discussions in this chapter for detailed information on existing conditions and explanation of the targets

RTOs

Innovation and Technology RTO-1: Signal Interconnection Project

Complete the Project to Upgrade Traffic Signals to Regional Ethernet and/or Fiber-Optic Interconnection

Traffic signal interconnection establishes a connection among individual traffic signals and a central management system, enabling remote access to the signals from a traffic management or operations center. Interconnections allow signal timings to be adjusted remotely during regular day-to-day operations, major incidents, and special events. Regional interconnection also enables cross-jurisdiction communications, coordination, and data exchange to respond to varying traffic conditions.

CCTA is currently working on a new project to identify and implement improvements to traffic signals in each subregion. CCTA will work with Central County's jurisdictions to interconnect selected signals in Martinez, Pleasant Hill, Concord, Clayton, and Walnut Creek, and in unincorporated Contra Costa County portions of Central County, using funding primarily from MTC's OBAG Cycle 3 program. Since this effort is already underway, the target for this RTO is the completion of signal interconnection improvements by 2027. There is no additional target for 2050 because there are no plans for a further interconnection program.

Actions

The following Actions are necessary to achieve the RTO targets and to implement other goals and policies of this Action Plan, the CTP, and other regional long-range planning documents with shared priorities. For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion's incorporated cities and the unincorporated portion of central Contra Costa County. All Actions are enumerated in a summary table in Appendix C, which also lists the responsible agency, partner agencies, and proposed timeline for each Action.

- Innovation and Technology-1: Implement micro-mobility recommendations from the Countywide Bicycle and Pedestrian Plan, including those related to ordinances and requests for proposals (RFPs), and work with operators to deploy micro-mobility systems built with industry best management practices.
- Innovation and Technology-2: Continue to implement a program to support deployment of high-quality, fast, and diverse electrical vehicle chargers in the subregion.
- Innovation and Technology-3: Interconnect the Central County signal system to enable remote access to the signals from a traffic management or operations center. These signals, located on key corridors and major arterials, were identified through the Countywide Smart Signals Project based on the following prioritized criteria:
 - On RRS
 - In or providing access to a PDA, downtown, or commercial district
 - Presence of bus routes at the intersection
 - Connection to BART
 - Presence of bicycle facilities at the intersection
 - High number of bicycle and pedestrian collisions
 - Geographic distribution across the County and the subregion
 - Connection to shared mobility hubs
 - High traffic volume
 - Innovate 680 (non-Caltrans intersections)
- Innovation and Technology-4: Examine the feasibility of implementing a pilot Automated Driving System or other modal technologies (such as an autonomous shuttle) somewhere in the Central County area.
- Innovation and Technology-5: Work with local transit agencies, regional policymakers, and private entities to promote pooled regional ridesharing services.

- Innovation and Technology-6: Coordinate with CCTA and local jurisdictions to identify solutions to the Intelligent Transportation System (ITS) communications needs during the development and implementation of a Regional ITS Communications Plan and/or regional communications infrastructure, including expanding fiber to link all traffic signals and bolster communications for signals, etc.
- Innovation and Technology-7: Work with CCTA to determine a method for tracking the availability of EV charging stations.
- Innovation and Technology-8: Work with CCTA to mediate adoption and implementation of emerging technologies to ensure that they are feasible and do not cause adverse effects on the transportation system.
- Innovation and Technology-9: Work with BART to expand the on-demand bicycle parking program for e-bicycles and scooters at BART stations throughout Contra Costa County.
- Innovation and Technology-10: Work with CCTA and local jurisdictions to implement the CCTA EV Readiness Blueprint.

Central County Action Plan

Chapter 12: Financial Outlook



The Measure J GMP requires that local jurisdictions participate in a Regional Transportation Mitigation Program (RTMP) to mitigate the impact of new development on the regional and subregional transportation system. The RTMP may include fees, assessments, or other mitigations, as appropriate, to ensure that new growth pays its fair share for the transportation impacts that it generates. The RTMPs are in addition to transportation impact fees that local jurisdictions may implement on new development as specified in each jurisdiction's local fee program. Establishment of the RTMP may include not only the transportation impacts on existing facilities, but also jobs/housing balance, carpool and vanpool programs, and proximity to transit service. This Action Plan is not financially constrained; it includes both funded and unfunded Actions. These Actions will be considered for inclusion in CCTA's 2023 CTP Update, which will include both financially constrained and unconstrained project lists. The identified projects qualify for inclusion in the Authority's Comprehensive Transportation Project List, which will be revised in the 2023 CTP Update.

TRANSPAC Subregional Transportation Mitigation Program (STMP)

TRANSPAC adopted an STMP to ensure that new development pays to mitigate its impacts, as required by Measure J. The TRANSPAC STMP was included in the 2009 and 2017 Central County Action Plan based on the TRANSPAC RTMP, which was adopted by TRANSPAC and its member jurisdictions in 1996.

The STMP is modeled after the approach used for Oakhurst development in Clayton in the early 1990s. The Oakhurst project, with 1,480 units, generated \$1.1 million in transportation fee revenues. An origin-and-destination study determined the percentage of westbound peak-hour Ygnacio Valley Road through-trips at Civic Drive attributable to Clayton, and this percentage formed the base cost of the transportation mitigations.

Under the TRANSPAC STMP, the impacts of any new development are determined through the size and type of development, and project-specific mitigations are developed through collaborative mitigation agreements discussed and determined between affected Central County jurisdictions. While the STMP is predicated on a project basis and, as a result, calculated differently from the per-unit and per commercial-square-foot fee programs used by other Contra Costa RTPCs, the combination of regional and local fees generally aligns in the aggregate with the fee programs in the other RTPC areas, especially fee charges in the Tri-Valley area, which has slightly lower commercial fees than the TRANSPAC area. Fees range from \$0 to \$496 per square foot of residential space.

Agreements negotiated by TRANSPAC jurisdictions with jurisdictions in other RTPCs have also required similar traffic mitigation. For example, in March 2006, the cities of Concord and Pittsburg negotiated fee agreements for the Vista Del Mar (formally known as Alves Ranch) and Bailey Road Estates projects. In addition to paying the standard East County local and regional fees, the Vista Del Mar and Bailey Estates developer will also pay additional fair-share traffic mitigation to the City of Concord.

Actions

- Financial-1: Continue to participate and periodically update the TRANSPAC Subregional Transportation Mitigation Program and the Central Contra Costa Traffic Management Program to ensure it is addressing the needs of the regional transportation system.

Shared Facilities

Implementation of many of the transportation system improvements in this Action Plan will benefit multiple jurisdictions. Each of these improvements needs a negotiated agreement about cost sharing between jurisdictions. The cost-sharing approach could be based on which jurisdiction's traffic is expected to use the facility, on the boundaries within which the facility lies, or a combination. These agreements should be negotiated in advance so that when development takes place, the responsibility for improvements is clear.

Central County Action Plan

Chapter 13: Procedures for Notification, Review, and Monitoring



Action Plans are required to include a set of procedures to share environmental documents, review GPAs, and monitor progress in attaining the traffic service objectives. The procedures for notification, monitoring, and review are described herein.

Role of Regional Transportation Planning Committees

The RTPC for each subregion is made up of one elected and appointed representative from each jurisdiction within that subregion. One official from each transit agency and planning commissions also serve on some of the RTPCs, either as voting or nonvoting members. The RTPCs are groups that engage in multi-jurisdictional and collaborative planning work to improve the transportation system in Contra Costa and build consensus for projects and programs over the whole subregion. Each RTPC

oversees one Action Plan, except for the Southwest Area Transportation Committee, which oversees two subregions (each with its own Action Plan).

In addition to their responsibilities for preparing and updating the Action Plans, the RTPCs are involved in various transportation planning efforts. Central Contra Costa Transportation Committee, also known as the Transportation Partnership and Cooperation committee (TRANSPAC), for example, is involved in the Innovate I-680 project, and WCCTAC started Richmond ferry service and completed over- and undercrossing projects. In East County, TRANSPLAN continues planning for a link to Pittsburg/Antioch BART and improvements to SR-239 with Alameda and San Joaquin Counties. In the Southwest Area, work underway includes several bicycle and pedestrian overcrossings of major thoroughfares.

Circulation of Environmental Documents and Transportation Impact Studies

The Action Plan is required to have a set of procedures to share environmental documents and transportation impact studies. This notification is to occur through the process outlined in Chapter 4 of the CCTA *Implementation Guide*.²⁵

The Action Plan sets the threshold for circulating transportation impact studies and/or environmental impact reports (EIRs) to neighboring jurisdictions, consistent with the CCTA *Implementation Guide*.²⁶ This threshold states that any project that generates at least 100 Net New Peak Hour Vehicle Trips (NNPHVTs) triggers preparation of a transportation impact study and notification of neighboring jurisdictions. Examples of projects that could generate more than 100 NNPHVTs are:

- A single-family residential development of more than 100 units
- A condominium development of more than 180 units
- A retail center of at least 14,000 square feet
- A general office building of at least 44,000 square feet

The following procedures are to be followed by the jurisdictions of TRANSPAC regarding circulation of environmental documentation:

- For any proposed project or GPA that generates more than 100 NNPHVTs during the peak hour and for which an environmental document is being prepared (Negative Declaration, EIR, or Environmental Impact Statement), the lead agency shall issue a “notice of intent” to issue a negative declaration or NOP for an EIR to TRANSPAC staff, all RTPC chairs or designated staff persons, and to each member jurisdiction of TRANSPAC, and shall complete a transportation impact study.

²⁵ More information on the thresholds and procedures around circulating of environmental documents and transportation impact studies can be found in Chapter 4 of the CCTA *Implementation Guide*, Evaluating the Impacts of Proposed New Development and General Plan Amendments.

- For any proposed project or GPA that generates more than 100 NNPHVTs during the peak hour and for which an environmental will not be prepared, the lead agency shall complete a transportation impact study and alert TRANSPAC staff, all RTPC chairs or designated staff persons, and each member jurisdiction of TRANSPAC of the study's preparation.
- TRANSPAC shall notify its member jurisdictions of receipt of such notices from jurisdictions in other subregions.
- When the environmental document and/or transportation impact study described under points one and two are completed, the lead agency shall notify TRANSPAC staff, all RTPC chairs or designated staff persons, and each member jurisdiction of TRANSPAC.
- TRANSPAC staff shall review development projects for compliance with the technical procedures regarding evaluation of new development proposals.

Note that these requirements apply to all projects generating 100 NNPHVTs or more, regardless of whether a CEQA document is prepared.²⁷ Further, the transportation impact study required under CCTA regulations is to cover congestion impacts and VMT, and hence will meet and exceed the requirements of CEQA, which no longer requires assessment of congestion impacts since the implementation of Senate Bill 743.

Review of General Plan Amendments

This Action Plan was developed using land use forecasts that generally reflect future land development allowed within the framework of the adopted general plans for jurisdictions in Central County, and do not yet reflect additional development capacity and by-right land use modifications under state laws that became effective on January 1, 2023. GPAs enacted after adoption of the Action Plan could therefore adversely affect the ability to meet this Action Plan's goals, policies, and objectives.

The CCTA *Implementation Guide* requires that each Action Plan contain a process for notification and review of the impact of proposed GPAs that exceed a specified threshold size of 500 NNPHVTs and subsequently is determined to generate 100 or more interregional NNPHVTs on an RRS. Accordingly, the process outlined here has been adopted by TRANSPAC. This process is also shown in more detail in the CCTA *Implementation Guide* in Chapter 4, Evaluating the Impacts of Proposed New Development and General Plan Amendments.

In addition to the project review procedures described, the following procedures are to be followed for GPAs that generate more than 100 NNPHVTs:

- Through its participation in TRANSPAC, the jurisdiction preparing the GPA shall notify TRANSPAC and its member jurisdictions of the proposed GPA in accordance with the above notification and circulation requirements for environmental documents and transportation impact studies, along with any mitigations.

²⁷ This threshold matches the CCTA *Implementation Guide* recommendation for circulation of environmental documents and transportation impact studies. Some subregions may adopt more stringent thresholds if desired.

- Upon request by TRANSPAC, the jurisdiction considering the amendment shall confer with TRANSPAC staff and/or attend a meeting of either the TRANSPAC TAC and/or the TRANSPAC Committee, to discuss the impacts of the proposed GPA on the adopted Action Plan, along with any mitigations. During these discussions:
 - The lead agency proposing the GPA should demonstrate that the amendment will not adversely affect the TRANSPAC jurisdictions' ability to implement this Action Plan or should propose amendments to the GPA to allow this to be the case.
 - Alternatively, the lead agency proposing the GPA can propose modifications to this Action Plan for consideration by TRANSPAC.

The lead agency and TRANSPAC will participate in these discussions with the intent of arriving at an interjurisdictional agreement to mitigate cumulative impacts that could occur and to reach consensus for the proposed GPA that will not adversely affect the ability to implement this Action Plan (as it may be amended).²⁸ If this does not occur, approval of the GPA by the lead jurisdiction may lead to compliance issues with the CCTA GMP.

Schedule for Action Plan Review

From time to time, this Action Plan will be reviewed in coordination with CCTA's CTP Update. In accordance with the CCTA GMP *Implementation Guide* for guidance on the development and updates of Action Plans.

The review process will involve:

- Regular monitoring of transportation conditions on RRS and reporting to TRANSPAC on RTO performance.
- Identification of RTOs not being met, which would trigger a focused revision to the Action Plan.
- A complete review of the Action Plan on a four- to five-year cycle, coordinated with updates to the CTP.
- Review of individual corridors, RTOs, and other Action Plan components as deemed appropriate by TRANSPAC.

Regional Traffic Management

As with the 2014 Action Plan process, the analyses conducted in preparing this Action Plan update have revealed that traffic conditions in Central County are influenced by many factors beyond the control of TRANSPAC and its jurisdictions. TRANSPAC and its jurisdictions remain committed to work individually and collectively to pursue cooperative planning studies and projects with other Contra Costa RTPCs and Bay Area counties to address regional transportation issues.

²⁸ Cumulative impacts are generally defined as a) existing traffic counts plus b) approved projects which have not yet been constructed or operated plus c) pending projects under review and consideration for approval by the proper agency(ies) plus d) any anticipated projects for which environmental review has been completed.

Implications for Compliance with the Measure J Growth Management Program

The CCTA *Implementation Guide* describes the conditions for GMP compliance that relate specifically to Action Plans. According to the *Implementation Guide*, each member jurisdiction must:

- ▣ Participate in the preparation and adoption of Action Plans.
- ▣ Implement actions to attain RTOs.
- ▣ Place conditions on project approvals consistent with the growth management strategy.
- ▣ Circulate environmental documents and transportation impact studies as specified in this Action Plan and consistent with CCTA policy.
- ▣ Participate in the development application and GPA review procedure.

Process for Addressing RTO Exceedances

CCTA will monitor transportation conditions in Central County and all of Contra Costa County to determine whether the RTOs in this and other Action Plans are being achieved. Under adopted CCTA policy, exceedance of an RTO does not constitute a compliance issue with the GMP.

If it is determined through CCTA's monitoring program that any RTOs are not being met, CCTA will convey this information to TRANSPAC and the respective local agency for consideration in its ongoing monitoring of the Action Plan. The *Implementation Guide* states that if satisfactory progress is observed, then implementation of the Action Plan will continue. If progress has not been satisfactory, then the procedures for development application review and GPAs, as established in the *CCTA Implementation Guide*, shall apply.

Given the level of expected growth in Central County and elsewhere throughout Contra Costa County and the constraints on adding new capacity to the system, it should not be surprising if some RTOs are not attained. If nonattainment occurs, the only required action required is for TRANSPAC to document the condition and continue to monitor and address the RTOs in future updates to the Action Plan every four to five years, as established in this chapter.

In the case where a proposed development project or GPA causes an exceedance or exacerbates a situation where an already exceeded RTO is worsened, then the procedures for development application review and GPAs, as established in the *CCTA Implementation Guide* shall apply.





Appendix A:

Summary of RTOs and Targets

Appendix A: Summary of RTOs and Targets

Table A-1: Summary RTOs and Targets

RTO Name	Definition	Proposed 2027 Target	Proposed 2050 Target
Transit RTO-1: Transit Mode Share	Increase mode share of transit trips	13% commute trips 4% of all trips	20% of commute trips 8% of all trips
Transit RTO-2: Mode Share to/from BART	Increase mode share of people accessing BART with non-vehicle modes	24%	34%
Transit RTO-3: Transit Trip Time	Optimize peak commute travel time on transit for key corridors	Transit time \leq auto travel time	Transit time \leq auto travel time
Transit RTO-4: High Quality Transit Access	Increase urbanized land area served by high quality transit	11%	25%
Transit RTO-5: Paratransit and Community-Based Transportation Program Access	Increase rides through paratransit and community-based transportation programs	Increase by 5%	Increase by 20%
Active Transportation RTO-1: Active Transportation Mode Share	Increase active transportation mode share	7.5% all trips ^a 2.4% commute trips	12% all trips 4% for commute trips
Active Transportation RTO-2: Low Stress Bicycle Network	Increase completeness of the LSBN	41%	90%
Active Transportation RTO-3: Unprotected Trail Crossings	Eliminate unprotected crossings of the LSBN intersections with roadways	No unprotected crossings	No unprotected crossings
Roadways RTO-1: Freeway Delay Index	Maintain current delay index	DI \leq 4.0 (I-680) DI \leq 3.0 (SR-242) DI \leq 5.0 (SR-4)	DI \leq 4.0 (I-680) DI \leq 3.0 (SR-242) DI \leq 5.0 (SR-4)
Roadways RTO-2: Freeway Buffer Index	Maintain current buffer index	Buffer index: 0.5	Buffer index: 0.5

RTO Name	Definition	Proposed 2027 Target	Proposed 2050 Target
Roadways RTO-3: Intersection LOS	Maintain LOS at RTO monitoring locations	LOS D in all areas except for downtowns, key school sites, and freeway ramps; LOS E at freeway ramps; no LOS standards for downtowns, key school sites, or Transit Priority Areas, or at the following intersections: Geary Road and North Main Street; Treat Boulevard and Geary Road; Treat Boulevard and Bancroft Road; Ygnacio Valley Road and Bancroft Road; Ygnacio Valley Road and Civic Drive	LOS D in all areas except for downtowns, key school sites, and freeway ramps; LOS E at freeway ramps; no LOS standards for downtowns, key school sites, or Transit Priority Areas, or at the following intersections: Geary Road and North Main Street; Treat Boulevard and Geary Road; Treat Boulevard and Bancroft Road; Ygnacio Valley Road and Bancroft Road; Ygnacio Valley Road and Civic Drive
Roadways RTO-4: Roadway Segment LOS	Maintain LOS on two-lane roadways outside of urban areas	LOS E (<40 mph)	LOS E (<40 mph)
Safety RTO-1: KSI Collisions	Eliminate collisions that result in fatality or severe injury	Zero fatality and severe injury collisions ^b	
Safety RTO-2: Active Transportation Collisions	Eliminate collisions involving users of active transportation		
Safety RTO-3: Active Transportation Collisions near Schools ^c	Eliminate active transportation-involved collisions occurring within 500 feet of schools		
Equity RTO-1: EPC Low-Stress Bicycle Network	Proportion of the LSBN that is complete in EPCs, as compared to Central County as whole	Increase level of LSBN completion to match or exceed that of Central County as a whole	

RTO Name	Definition	Proposed 2027 Target	Proposed 2050 Target
Equity RTO-2: Collisions in EPCs	Proportion of KSI collisions that occur in EPCs, as compared to Central County as whole	Decrease collision rates to match Central County as whole	
Equity RTO-3: EPC Job Access: Driving	Share of jobs accessible by EPCs residents with a 30-minute drive, as compared to Central County as whole	Increase job access to match Central County as a whole	
Equity RTO-4: EPC Job Access: Transit	Share of jobs accessible by EPCs residents with a 45-minute transit trip, as compared to Central County as whole	Increase job access to match or exceed that of Central County as a whole	
Equity RTO-5: EPC Access to High-Quality Transit	Total number of EPC acres within a high-quality transit buffer, as compared to Central County as whole	Increase access to high quality transit to match or exceed that of Central County as a whole	
Climate Change RTO-1: Single-Occupant Vehicle (SOV) Mode Share	Decrease SOV mode share per capita	72% for commute trips	57% for commute trips
Climate Change RTO-2: Carpool Mode Share	Increase carpool mode share	13% for commute trips	20% for commute trips
Climate Change RTO-3: Vehicle Miles Traveled	Decrease VMT per capita	26.6 VMT	21 VMT
Climate Change RTO-4: Greenhouse Gas Emissions	Decrease GHG emissions per capita	17 lbs per capita	Zero transportation related
Climate Change RTO-5: Zero-Emission Vehicles	Increase registered electric vehicles	50% of total market share	100% of total market share
Innovation and Technology RTO-1: Signal Interconnection Project ^d	Increase connected signals	Complete Signal Interconnection Project	None

- a) "All trips" refers to all trips with an origin or destination in Central County.
- b) CCTA codified Vision Zero work through Resolution 21-40-G which adopts the Contra Costa Countywide Transportation Safety Policy and Implementation Guide for Local Agencies.
- c) Schools in this analysis refer to all public and private grade K-12 schools.
- d) The CCTA Signal Interconnection Project is currently underway. Traffic signals for interconnection will be determined after publication of the Action Plan. The project is scheduled to be completed by 2027. Therefore, there are no signal interconnections proposed after 2027 unless identified later on through the project. Future interconnection may be determined in the next Action Plan update process.

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Appendix B:

**RTOs Considered but
not Recommended for
Adoption in this Action
Plan**

Central County Action Plan

Appendix B: RTOs Considered but not Recommended for Adoption in this Action Plan

Throughout the Action Plan update, several objectives were considered and evaluated but not carried forward into this Action Plan update. These potential metrics and RTOs were found by CCTA and its consultants to be difficult to quantify and track in the Action Plan due to lack of available data. Should new data become available, they could potentially be tracked and added in future updates.

- **Wait time for paratransit.** CCTA and the RTPC technical advisory committees (TAC) were interested in tracking wait time for paratransit to expand from the work in CCTA's Accessible Transportation Strategic Plan. The topic was not recommended for this Action Plan because paratransit scheduling and function are not conducive to such a metric. This Action Plan uses a different paratransit metric in Chapter 5, Transit, and includes actions that support implementation of the strategic plan.
- **Bicycle ownership.** The intent of a bicycle or e-bicycle ownership RTO would be to understand the proportion of a subregion's population that owns devices and therefore understands the availability of active transportation such as bicycling. However, there are no data sources that track the number of existing bicycles or e-bicycles or their ownership status, and there is no mechanism in place to track this moving forward.
- **Number of shared scooters, shared bicycles, and public autonomous vehicles that are deployed.** As of publication of this Action Plan, there is only one subarea in all of Contra Costa County with an active micro-mobility program and only one other subarea currently pursuing deployment of its own. CCTA and its consultants agreed that the most efficient way to incorporate shared mobility is to first support CCTA in a regional leadership role, similar to what the Transportation Authority of Marin and the Sonoma County Transportation Authority have done. This role could include working with operators and jurisdictions to create a draft ordinance and/or Request for Proposals (RFPs) or a set of model standards for the local jurisdictions to adopt locally.
- **Pavement condition on the countywide Low-Stress Bicycle Network (LSBN).** No programs currently track pavement condition on the entire countywide LSBN. Pavement condition is currently tracked in a few areas of the county, but such tracking is for roadway segments used for vehicles only and does not include the portions of roadways used for walking or bicycling. Further, data on pavement condition, such as tracked by East Bay Regional Parks District, do not reflect true pavement conditions because they do not account for conditions resulting from tree uprooting, settling, or damage.
- **Use of shared (pooled) Transportation Network Companies.** Data assembled before the pandemic showed that Transportation Network Companies (TNC), such as Lyft and Uber, led to increases in VMT and congestion. However, shared TNC rides (or "pooled rides"), in which several unrelated riders share a vehicle for a trip, could reduce VMT and congestion. For this reason,

shared TNC rides were used as a metric in the Action Plan. However, the pandemic led to the cancellation of shared services by both Lyft and Uber in the greater Bay Area, so it is impossible to track such rides today. Moreover, data from Lyft and Uber are difficult to obtain.

- **Average commute time for low-income residents versus higher-income residents.** The Action Plan team was interested to know if there is a correlation between the time that commuters spend traveling to and from work and their income. Specifically, RTPC TAC members were curious to know if low-income commuters spend a disproportionately longer time traveling to work than higher-income commuters. Based on American Community Survey data, the project team found that the correlation value between income and commute time was 0.3 in 2019, indicating a weak correlation.
- **Miles of Routes of Regional Significance estimated to be vulnerable to sea-level rise.** The Action Plan team identified all key facilities subject to inundation through sea-level rise, which were limited to bay shore areas in West, Central, and East County. Through this exercise, the project team determined that the majority of RRS or other infrastructure are in areas where private property owners and entities, such as Union Pacific Railroad, will likely work with local agencies to protect their infrastructure, thereby reducing the need for local intervention. In cases where local intervention or action would need to occur, sea-level rise adaptation planning will occur incrementally over time and is likely already being considered, such as through the current update to the Contra Costa County General Plan and Climate Action Plan and regional work through agencies such as the Association of Bay Area Governments and State working groups. Furthermore, it is difficult to know the true extent of infrastructure impacted by sea-level rise due to elevation of existing roadways (which may not be at sea level, such as the Carquinez Bridge) and unknowns related to vital infrastructure along these routes that may not be identified, such as bus storage lots or utility boxes.
- **Percentage of vulnerable RRSs for which remediation plans or a mitigation approach have been created.** Since the project team does not propose moving forward with the previous RTO, we recommend not moving forward with this RTO.
- **Speed reduction.** CCTA's Vision Zero effort includes speed reduction as a defined goal. The CCTA Vision Zero *Implementation Guide* for Local Jurisdictions points to encouraging safe speeds as a key priority. Mobile device data can be used to measure existing prevailing speeds on specific roadways; however, this mobile device data can be difficult to gather, especially in a large geographic area.
- **Electric vehicle chargers.** The Action Plan team and several RTPC TAC members questioned the inclusion of an RTO tracking the number of EV charging stations. The project team pursued such an RTO and found that several data obstacles presented an issue to accurately reporting the number of EV charging stations. Some limitations include, but are not limited to, certain brand EV chargers being exclusive to specific EV models, lack of accurate reporting, chargers advertised as public chargers being inaccessible behind various barriers, such as parking garages or private gates, and general uncertainty around the number of EV charging stations that exist in single- and multifamily homes. Therefore, this RTO has not been included in the Action Plan. However, this Action Plan does include Action Innovation and Technology-7: Work with CCTA to determine a method for tracking the availability of EV charging stations. The intention of this Action is to ensure that there be an accurate way to track the number of EV charging stations in the Central County subregion in the coming years.



Appendix C:

Summary of Actions

Central County Action Plan

Appendix C: Summary of Actions

Actions are contained in Chapters 5 through 11 of this Action Plan. This appendix repeats all actions from those chapters for ease of reference on a single list of actions, in Table C-1.

As noted in Chapter 1, Introduction, this Action Plan constitutes a work program for TRANSPAC, CCTA, and its member agencies, with some actions to be completed by outside agencies, such as Caltrans and BART. For each Action, a “Lead Agency” is listed, which indicates the agency that should take the lead in implementing the Action. Additional “Partner Agencies” are also listed, who may provide staff support or financing, or who may have to adopt or implement parts of the Action after the Lead Agency initiates it. In some cases, a Lead or Partner Agency assigned to an action may change over time as need arises. Further, in some cases, a Lead Agency listed in Appendix C-1 may not be responsible for every component of an Action, such as funding. In these cases, the Lead Agency can work with CCTA and TRANSPAC to determine the appropriate party for certain components of an Action.

For Contra Costa jurisdictions, requirements for compliance with the GMP are provided in the CCTA *Implementation Guide*, which specifies that Contra Costa jurisdictions have an obligation to implement Actions consistent with the time frame of the Action Plans. Compliance with this requirement will be evaluated by CCTA every other year, based on a Compliance Reporting Checklist submitted by the subregion’s incorporated cities and unincorporated portions of central Contra Costa County.

Each Action has a “timeframe,” which indicates when the Action is expected to occur. The timeframes listed are:

- Near-Term: To be completed within two years from the time of Action Plan adoption.
- Mid-Term: To be completed within five years from the time of Action Plan adoption.
- Long-Term: To be completed within 10 years from the time of Action Plan adoption.
- Ongoing: To be initiated immediately upon Action Plan adoption and to be continued on an ongoing basis.

Table C-1: Summary of Action and Applicable Detail

Action	Lead Agency	Partner Agency	Timeline
CHAPTER 5, TRANSIT			
<ul style="list-style-type: none"> ■ Transit-1: Work with CCTA, local jurisdictions, and local public transit operators to: <ul style="list-style-type: none"> • Link transit service in the entire subregion, including more directly to communities within Central County, between BART stations, and between adjacent Central County communities. • Standardize operations, regional mapping, and wayfinding. • Implement traffic signal management and bus prioritization technology on transit RRS to improve bus speed and reliability. • Implement improvements that increase the capacity and efficiency of local transit on Regional Routes. • Promote coordination of transfer times among Express bus, feeder bus, BART, and park-and-ride lots. 	CCTA	TRANSPAC Central County Member Jurisdictions Central County bus operators BART	ongoing
<ul style="list-style-type: none"> ■ Transit-2: Complete general improvements to BART stations to increase their use, including: <ul style="list-style-type: none"> • Pursue projects and programs that improve the passenger experience, such as upgrade systems, modernize stations, and expand the passenger capacity of BART stations 	Central County transit operators	CCTA TRANSPAC Central County Member Jurisdictions	long-term

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Continue to work with CCTA and local jurisdictions to improve circulation and prioritize walking, bicycling, and bus transit access near major transit stops and stations. 			
<ul style="list-style-type: none"> Transit-3: Support the expansion of ferry service to and from San Francisco and Contra Costa County. 	CCTA	TRANSPAC WETA Central County Member Jurisdictions	near-term
<ul style="list-style-type: none"> Transit-4: Implement the recommendations of the Contra Costa Accessible Transportation Strategic Plan, including the establishment of a new Coordinating Entity and establishing new, ongoing, and dedicated funding sources. 	CCTA	TRANSPAC Central County Member Jurisdictions Central County transit operators Central County Paratransit providers	near-term
<ul style="list-style-type: none"> Transit-5: Develop a program to establish, operate, and maintain existing and additional public or private park-and-ride facilities at appropriate locations, including shared-use agreements at activity centers with underutilized parking spaces. 	CCTA	TRANSPAC Caltrans Central County Member Jurisdictions Central County transit operators	mid-term
<ul style="list-style-type: none"> Transit-6: Work with local jurisdictions to develop intermodal transportation facilities (“Mobility Hubs”) that serve major activity centers and connect transit, pedestrian, bicycle facilities, and car/ride 	CCTA	TRANSPAC Central County Member Jurisdictions	mid-term

Action	Lead Agency	Partner Agency	Timeline
share in their planning documents, and site park-and-ride facilities, where needed and feasible.		Central County transit operators	
<ul style="list-style-type: none"> Transit-7: Participate in current or future studies regarding rail options for the Central County area and continue exploring development of new rail stations. 	CCTA	TRANSPAC BART Central County Member Jurisdictions Capitol Corridor Caltrans Amtrak San Joaquin JPA Central County transit operators	ongoing
<ul style="list-style-type: none"> Transit-8: Work with CCTA and local transit operators to explore financial incentives and reduced fares for public transit, including a feasibility study to explore a subregional or countywide Universal Basic Mobility program. 	CCTA	TRANSPAC Central County Member Jurisdictions Central County transit operators MTC	mid-term
<ul style="list-style-type: none"> Transit-9: Evaluate systemwide bus stop improvements; make it safer and easier for people to access transit stations; and ensure that transit, and its related pedestrian access and connectivity, is safe and attractive. 	CCTA	TRANSPAC Central County Member Jurisdictions Central County transit operators	mid-term
<ul style="list-style-type: none"> Transit-10: Provide educational awareness of public transportation options through outreach, 	511CC	TRANSPAC Central County Member	ongoing

Action	Lead Agency	Partner Agency	Timeline
education, and advertising, particularly in local schools.		Jurisdictions Central County transit operators	
<ul style="list-style-type: none"> Transit-11: Assist local jurisdictions in reviewing and considering options for improving curb management and bus and truck loading on public streets. 	CCTA	Central County Member Jurisdictions	near-term
<ul style="list-style-type: none"> Transit-12: Work with CCTA to fund and develop a regional mapping data services digital platform to enable the standardization and routine updating of digital and paper maps across all transit services. 	CCTA	TRANSPAC MTC Central County Member Jurisdictions Central County transit operators	near-term
<ul style="list-style-type: none"> Transit-13: Complete a feasibility study to explore feasibility of a Regional Express Bus Program and expansion and enhancement of Bus Rapid Transit, along transit corridors and RRS. 	CCTA	TRANSPAC Central County Member Jurisdictions Central County transit operators	near-term
<ul style="list-style-type: none"> Transit-14: Adopt local policies that prioritize safety for the most vulnerable users at all stages of project planning and delivery. 	Central County Member Jurisdictions	CCTA Central County transit operators	near-term
<ul style="list-style-type: none"> Transit-15: Work with CCTA and local transit providers to ensure real-time online transit information for all routes. 	CCTA	CCTA Central County Member Jurisdictions	mid-term

Action	Lead Agency	Partner Agency	Timeline
		Central County transit operators	
<ul style="list-style-type: none"> Transit-16: Assist local jurisdictions in the development of design guidelines and objective design standards to support transit-oriented development in downtowns, PDAs, transit priority areas, and other areas well served by transit. 	CCTA	MTC Central County Member Jurisdictions Central County transit operators	mid-term
<ul style="list-style-type: none"> Transit-17: Work with CCTA and public transit providers to identify and prioritize a network of transit corridors for transit signal priority, part-time transit lanes, transit-only lanes, and other transit-focused improvements. 	CCTA	TRANSPAC Central County Member Jurisdictions Central County transit operators	long-term
<ul style="list-style-type: none"> Transit-18: Work with CCTA and the future accessible transportation Coordinating Entity to explore additional RTOs related to accessible transportation for inclusion in the next Action Plan update. 	CCTA	Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Transit-19: Work with CCTA and local transit providers to reinstate high-quality transit that operated in the subregion prior to the pandemic. 	CCTA	Central County Member Jurisdictions Central County transit operators	mid-term
CHAPTER 6, ACTIVE TRANSPORTATION			
<ul style="list-style-type: none"> Active Transportation-1: Prioritize the needs of pedestrians and bicyclists in the design, 	CCTA	TRANSPAC Central County Member Jurisdictions	ongoing

Action	Lead Agency	Partner Agency	Timeline
construction, and maintenance of development projects.			
<ul style="list-style-type: none"> Active Transportation-2: Prioritize the needs of pedestrians and bicyclists and improve facilities along and connecting to RRS and activity centers. 	CCTA	TRANSPAC Central County Member Jurisdictions	ongoing
<ul style="list-style-type: none"> Active Transportation-3: Seek funding to provide bicycle parking infrastructure at employment sites and activity centers throughout Central County. 	511CC	BART Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Active Transportation-4: Work with local and regional jurisdictions to adopt and update bicycle and pedestrian plans to expand and/or improve facilities to ensure a seamless, safe, and contiguous, active transportation network that provides a positive user experience for people traveling for the daily-average distance/duration trip. 	CCTA	Central County Member Jurisdictions	ongoing
<ul style="list-style-type: none"> Active Transportation-5: Construct gap closure projects in the countywide low-stress bicycle facilities network to establish a safe and contiguous network, including, but not limited to: <ul style="list-style-type: none"> Pacheco Boulevard between SR-4 and Arthur Road Marsh Drive between the Marsh Drive Bridge over the Walnut Creek Flood Channel and Center Avenue Center Avenue between Marsh Drive and the Contra Costa Canal Regional Trail 	Central County Member Jurisdictions	Caltrans CCTA TRANSPAC East Bay Regional Park District	mid-term

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Imhoff Drive and Arnold Industrial Way Connection of the Iron Horse Trail to the north side of Willow Pass Road Between Todos Santos Plaza in Concord to the bicycle/pedestrian undercrossing of SR-242 Complete the marked shoulder to at least six feet wide on the road formerly known as Kirker Pass Road The path along the Standard Oil utility corridor in Pittsburg between the soon-to-be-installed traffic signal on Buchanan Road to North Park Boulevard SR-4 between Cummings Skyway and Hercules segment of the LSBN 			
<ul style="list-style-type: none"> Active Transportation-6: Construct bicycle and pedestrian crossing improvements at unprotected and semi-protected crossings of the LSBN and heavily traveled roadways. 	Central County Member Jurisdictions	CCTA East Bay Regional Park District	long-term
<ul style="list-style-type: none"> Active Transportation-7: Work with CCTA, Contra Costa Health Services, and Street Smarts Diablo Region to facilitate a countywide coordinated approach to Safe Routes to Schools programs, and to identify continuous (multi-year) funding sources to encourage students, employees, visitors, and residents at private and public K-12 schools, technical schools, and college 	CCTA	TRANSPAC Contra Costa Health Services Street Smarts Diablo School Districts Central County Member Jurisdictions	ongoing

Action	Lead Agency	Partner Agency	Timeline
sites to use non-vehicle modes to get to/from school.		Central County transit operators	
<ul style="list-style-type: none"> Active Transportation-8: Work with local jurisdictions to promote 511 Contra Costa's active transportation programs that increase awareness of multimodal travel options, travel behavior incentives, and safety through outreach, events, education, social media, marketing, and advertising. 	511CC	CCTA TRANSPAC Central County Member Jurisdictions Central County transit operators	ongoing
<ul style="list-style-type: none"> Active Transportation-9: Work with CCTA and MTC to promote Safe Routes to Transit projects and programs and submit applications for funding for construction of local Safe Routes to Transit projects and programs. 	511CC	MTC TRANSPAC Central County Member Jurisdictions Central County transit operators	ongoing
<ul style="list-style-type: none"> Active Transportation-10: Continue programs that reduce the cost of using electric bicycles and pursue new programs to reduce the cost of conventional (pedal) bicycle use for Contra Costa County residents. 	511CC	TRANSPAC Central County Member Jurisdictions	ongoing
<ul style="list-style-type: none"> Active Transportation-11: Work with CCTA, the East Bay Regional Parks District (EBRPD), and other public facilities management agencies to develop a method of tracking the Pavement Condition Index (PCI) of bicycle facility segments along the low-stress bicycle network and 	CCTA	East Bay Regional Park District Central County Member Jurisdictions	mid-term

Action	Lead Agency	Partner Agency	Timeline
implement rehabilitation, repair, and replacement modifications improvements where and as needed.			
<ul style="list-style-type: none"> Active Transportation-12: Work with Caltrans to prepare an incident management plan for Central County freeway corridors. 	CCTA	TRANSPAC Caltrans California Highway Patrol Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Active Transportation-13: Work with CCTA, CCWD, and the Flood Control District, to identify additional opportunities to utilize water distribution right-of-way for Low-Stress Bicycle facilities. 	CCTA	CCWD Flood Control District Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Active Transportation-14: Work with CCTA and local jurisdictions to explore installation of e-bicycle charging infrastructure in publicly accessible, and convenient places including trails, shared mobility hubs, existing and planned EV charging locations, and near commercial/retail establishments. 	CCTA	TRANSPAC Central County Member Jurisdictions East Bay Regional Parks District	mid-term
<ul style="list-style-type: none"> Active Transportation-15: Work with CCTA to conduct, update, and implement a comprehensive countywide Pedestrian Needs Assessment. 	CCTA	TRANSPAC East Bay Regional Parks District Central County Member Jurisdictions	mid-term

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Active Transportation-16: Work with CCTA, local jurisdiction staff from the County, and the cities of Lafayette and Walnut Creek to implement the Olympic Connector Project, to more seamlessly and safely connect the Lafayette-Moraga Trail to the Iron Horse Trail. 	CCTA	Central County Member Jurisdictions City of Lafayette City of Walnut Creek East Bay Regional Parks District	Near-term
<ul style="list-style-type: none"> Active Transportation-17: Work with CCTA and local jurisdiction planning and economic development staff to continually partner on increasing active transportation and transportation innovation in new development, with a focus on larger scale developments that have an opportunity for local conditions of approval that could require improvements to the active transportation network. 	CCTA	TRANSPAC Central County Member Jurisdictions	Ongoing
<ul style="list-style-type: none"> Active Transportation-18: Improve general sidewalk conditions subregion-wide, including but not limited to: <ul style="list-style-type: none"> The north side of Willow Pass Road as it crosses under I-680 Both sides of Treat Boulevard where the Contra Costa Canal Trail crosses 	Central County Member Jurisdictions	TRANSPAC CCTA	near-term

Action	Lead Agency	Partner Agency	Timeline
CHAPTER 7, ROADWAYS			
<ul style="list-style-type: none"> Roadways-1: Complete necessary operational improvements (e.g., protected turn lanes, synchronized signal timing, auxiliary lanes) on freeways, at intersections and on roadway segments that are needed to maintain the RTOs in this Action Plan, while ensuring balancing these improvements against the objectives and actions regarding other modes and issues covered by this Action Plan. 	Central County Member Jurisdictions	CCTA TRANSPAC Caltrans	ongoing
<ul style="list-style-type: none"> Roadways-2: Work with CCTA and local jurisdictions to complete a continuous high-occupancy vehicle (HOV) system on I-680, including the connection of the SR-4 HOV system to I-680. 	CCTA	TRANSPAC Central County Member Jurisdictions Caltrans	mid-term
<ul style="list-style-type: none"> Roadways-3: Work with applicable agencies to support consistent occupancy requirements for toll-free HOV/high-occupancy toll (HOT) lanes on the Benicia-Martinez Bridge and I-680. 	CCTA	TRANSPAC Central County Member Jurisdictions Caltrans	mid-term
<ul style="list-style-type: none"> Roadways-4: Improve the operational efficiency of freeways and arterial streets through effective corridor management strategies, such as ramp metering, traffic operations systems, Intelligent Transportation Systems improvements, HOV/HOT lane and bypass lanes, and others to support a cohesive transportation system for all modes. 	CCTA	TRANSPAC Central County Member Jurisdictions MTC Caltrans	long-term

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Roadways-5: Work with CCTA and local jurisdictions to continue studying the feasibility of pilot and long-term programs for bus on shoulder on Central County freeways. 	CCTA	TRANSPAC Caltrans Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Roadways-6: Work with CCTA, Caltrans, and California Highway Patrol to develop a program to track HOV/HOT and toll lane violators. 	CCTA	Caltrans MTC California Highway Patrol Central County Member Jurisdictions	near-term
<ul style="list-style-type: none"> Roadways-7: Work with Caltrans and CCTA and local jurisdictions to develop a program to discourage diversion from freeways and cut-through travel on surface roadways by developing traffic management programs, increasing trip capacity on freeways, completing freeway operational improvements, implementing traffic-calming measures on surface roadways, and exploring surface roadway redesign to support active and public transit modes. 	CCTA	TRANSPAC Caltrans Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Roadways-8: Work with CCTA to complete a Countywide Goods Movement Plan that promotes greater use of technology for communications and scheduling, funding for equipment upgrades for air quality improvements with cleaner technology, and an advocacy platform for goods movement and guidance for local jurisdictions. 	CCTA	TRANSPAC Central County Member Jurisdictions Caltrans	mid-term

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Roadways-9: Work with CCTA, Caltrans, and other applicable agencies to conduct Integrated Corridor Management (ICM) studies for Central County corridors to improve multimodal function of countywide facilities. 	CCTA	TRANSPAC Caltrans Central County Member Jurisdictions	long-term
<ul style="list-style-type: none"> Roadways-10: Conduct a study to develop a seamless HOV/HOT/Express Lane on SR-24. 	CCTA	TRANSPAC Central County Member Jurisdictions Caltrans	mid-term
<ul style="list-style-type: none"> Roadways-11: Develop subregional corridor management plans to provide adequate roadway capacity for local and subregional travel while also including both public and active transportation modes and nonmodal transportation issues such as equity, climate change, safety, and technology. 	CCTA	TRANSPAC Central County Member Jurisdictions Caltrans	long-term
<ul style="list-style-type: none"> Roadways-12: As part of the CTP process, study roadway improvements along key RRS, to include roadway cross sections showing changes to lane configurations, sidewalks, bicycle facilities, shoulders, and other roadway components. 	CCTA	TRANSPAC Central County Member Jurisdictions Caltrans	near-term
<ul style="list-style-type: none"> Roadways-13: Explore opportunities to work with LPMC to develop a traffic management program to discourage use of westbound/southbound traffic using Pleasant Hill Road north of SR-24 to bypass the I-680 SR-24 interchange. 	CCTA	TRANSPAC LPMC Caltrans Central County Member Jurisdictions	

Action	Lead Agency	Partner Agency	Timeline
CHAPTER 8, SAFETY			
<ul style="list-style-type: none"> Safety-1: Work with CCTA to implement the Countywide Vision Zero Framework and Safe System Approach to project scoping and delivery. 	CCTA	Central County Member Jurisdictions Caltrans	ongoing
<ul style="list-style-type: none"> Safety-2: Conduct a study to identify all safety-related transportation improvements needed within 500 feet of schools. 	CCTA	TRANSPAC Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Safety-3: Develop a program to coordinate the collection and analysis of safety data, identify areas of concern, and propose safety-related improvements and user awareness to support countywide, state, and federal safety programs and performance measures. 	CCTA	511CC Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Safety-4: Work with CCTA, MTC, and East Bay Regional Parks District (EBRPD) to study and mitigate the safety impacts of electric bicycles and other micro-mobility devices on local trails and streets, with the aim of eventually allowing electric bicycles, e-scooters, and other micro-mobility devices on all of these facilities. 	CCTA	TRANSPAC MTC East Bay Regional Parks District Central County Member Jurisdictions	near-term
<ul style="list-style-type: none"> Safety-5: Improve the safety of high-incident local roadways through physical changes, signage, technology, education, enforcement, or other tools. 	CCTA	TRANSPAC Central County Member Jurisdictions	ongoing

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Safety-6: Work with regional and local agencies to increase the level of multimodal public awareness and empathy about bicycle and pedestrian safety and to reduce injuries due to vehicle-involved collisions. 	511CC	TRANSPAC Central County Member Jurisdictions	ongoing
CHAPTER 9, EQUITY			
<ul style="list-style-type: none"> Equity-1: Conduct a study to identify strategies to increase low-income resident access to transit hubs, jobs, and areas with goods and services (for example, in Central County, the study could explore enhancing existing transit hubs, constructing new transit hubs, and first/last mile solutions). 	CCTA	TRANSPAC Central t County Transit operators Central County Member Jurisdictions	near-term
<ul style="list-style-type: none"> Equity-2: Increase access to car-sharing services for low-income residents and support financial incentives for using them. 	CCTA	TRANSPAC Central County Member Jurisdictions	ongoing
<ul style="list-style-type: none"> Equity-3: Increase express bus service to regional job centers, particularly those with low-income workers, inside and outside of the subregion. 	Central County Transit operators	CCTA TRANSPAC Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Equity-4: Increase high-frequency transit lines and stops in EPC areas. 	Central County Transit operators	CCTA TRANSPAC Central County Member Jurisdictions	mid-term

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Equity-5: Conduct a study of locations where there is a concentration of KSI collisions in EPCs to identify needed safety improvements and then implement the identified improvements. 	CCTA	TRANSPAC Central County Member Jurisdictions	near-term
CHAPTER 10, CLIMATE CHANGE			
<ul style="list-style-type: none"> Climate Change-1: Work with the 511 Contra Costa to continually expand and improve TDM Programs to educate and encourage Contra Costa residents, students, and commuters to use multimodal alternatives by promoting transit, shuttles, carpooling, vanpooling, walking, bicycling, alternative work schedules, and telecommuting. 	CCTA	TRANSPAC Central County Member Jurisdictions 511CC	mid-term
<ul style="list-style-type: none"> Climate Change-2: Work with regional agencies, local employers, and schools to increase remote work opportunities, compress work weeks, alternative work location, and flex schedules, and provide pre-tax employer transportation benefit programs. 	511CC	TRANSPAC Employers Central County Member Jurisdictions	ongoing
<ul style="list-style-type: none"> Climate Change-3: Continue to implement a program to support deployment of high-quality, fast and diverse EV chargers in the subregion. 	511CC	CCTA TRANSPAC Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Climate Change-4: Continue to promote EV ownership by offering financial incentives and providing educational programs and demonstrations. 	CCTA	TRANSPAC Central County Member Jurisdictions	ongoing

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Climate Change-5: Coordinate with impacted jurisdictions, property owners, and other applicable agencies that own or maintain RRS that would be impacted by sea level rise, to coordinate and plan for inundation mitigation. 	CCTA	TRANSPAC Caltrans BCDC Central County Member Jurisdictions Private Property Owners	long-term
<ul style="list-style-type: none"> Climate Change-6: Encourage regional agencies and local jurisdictions to refer to the Adapting to Rising Tides Adaptation Roadmap when planning for sea level rise. 	CCTA	Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Climate Change-7: Adopt local policies that prioritize mobility for GHG-reducing modes of transportation. 	Central County Member Jurisdictions	CCTA	Ongoing
CHAPTER 11, INNOVATION AND TECHNOLOGY			
<ul style="list-style-type: none"> Innovation and Technology-1: Implement micro-mobility recommendations from the Countywide Bicycle and Pedestrian Plan, including those related to ordinances and requests for proposals (RFPs), and work with operators to deploy micro-mobility systems built with industry best management practices. 	CCTA	Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Innovation and Technology-2: Continue to implement a program to support deployment of high-quality, fast, and diverse electrical vehicle chargers in the subregion. 	CCTA	TRANSPAC Central County Member Jurisdictions	ongoing

Action	Lead Agency	Partner Agency	Timeline
<p>■ Innovation and Technology-3: Interconnect the Central County signal system to enable remote access to the signals from a traffic management or operations center. These signals, located on key corridors and major arterials, were identified through the Countywide Smart Signals Project based on the following prioritized criteria:</p> <ul style="list-style-type: none"> • On RRS • In or providing access to a PDA, downtown, or commercial district • Presence of bus routes at the intersection • Connection to BART • Presence of bicycle facilities at the intersection • High number of bicycle and pedestrian collisions • Geographic distribution across the County and the subregion • Connection to shared mobility hubs • High traffic volume RRS • Innovate 680 (non-Caltrans intersections) 	CCTA	<p>TRANSPAC</p> <p>Central County Member Jurisdictions</p>	mid-term
<p>■ Innovation and Technology-4: Examine the feasibility of implementing a pilot Automated Driving System or other modal technologies (such as an autonomous shuttle) somewhere in the Central County area.</p>	CCTA	<p>TRANSPAC</p> <p>Central County Transit Operators</p> <p>Central County Member Jurisdictions</p>	ongoing

Action	Lead Agency	Partner Agency	Timeline
		Transportation Network Companies	
<ul style="list-style-type: none"> Innovation and Technology-5: Work with local transit agencies, regional policymakers, and private entities to promote pooled regional ridesharing services. 	CCTA	TRANSPAC Central County Transit Operators Central t County Member Jurisdictions Transportation Network Companies	ongoing
<ul style="list-style-type: none"> Innovation and Technology-6: Coordinate with CCTA and local jurisdictions to identify solutions to the Intelligent Transportation System (ITS) communications needs during the development and implementation of a Regional ITS Communications Plan and/or regional communications infrastructure, including expanding fiber to link all traffic signals and bolster communications for signals, etc. 	CCTA	TRANSPAC Central County Member Jurisdictions	near-term
<ul style="list-style-type: none"> Innovation and Technology-7: Work with CCTA to determine a method for tracking the availability of EV charging stations. 	CCTA	TRANSPAC Central County Member Jurisdictions	near-term
<ul style="list-style-type: none"> Innovation and Technology-8: Work with CCTA to mediate adoption and implementation of emerging technologies to ensure that they are feasible and do not cause adverse effects on the transportation system. 	CCTA	TRANSPAC Central County Member Jurisdictions	ongoing

Action	Lead Agency	Partner Agency	Timeline
<ul style="list-style-type: none"> Innovation and Technology-9: Work with BART to expand the on-demand bicycle parking program for e-bicycles and scooters at BART stations throughout Contra Costa County. 	BART	CCTA TRANSPAC Central County Member Jurisdictions	mid-term
<ul style="list-style-type: none"> Innovation and Technology-10: Work with CCTA and local jurisdictions to implement the CCTA EV Readiness Blueprint. 	CCTA	TRANSPAC Central County Member Jurisdictions	mid-term
CHAPTER 12, FINANCIAL OUTLOOK			
<ul style="list-style-type: none"> Financial-1: Continue to participate and periodically update the TRANSPAC Subregional Transportation Mitigation Program and the Central Contra Costa Traffic Management Program to ensure it is addressing the needs of the regional transportation system. 	Central County Member Jurisdictions	CCTA TRANSPAC Central Contra Costa Regional Fee & Financing Authority	ongoing



Appendix D:

Transportation Modeling Results

Central County Action Plan

Appendix D: Transportation Modeling Results

Table D-1: RTO Monitoring Location Peak-Hour LOS

Intersection	2019 A.M.		2019 P.M.		2050 A.M.		2050 P.M.	
	Los	Delay	Los	Delay	Los	Delay	Los	Delay
Alhambra Ave & Alhambra Valley Rd	B	16	C	21	B	16	C	21
Alhambra Ave & D St	C	23	B	12	C	28	B	12
Alhambra Ave & Elderwood Dr	B	14	B	15	B	15	B	15
Alhambra Ave & Paso Nogal Rd/ Virginia Hills Dr	C	26	C	26	F	>80	F	>80
Alhambra Ave & SR-4 WB Ramps	D	51	D	39	E	65	E	67
Alhambra Ave & State Route 4 (SR-4) EB Ramps	B	18	C	20	B	19	C	22
Bailey Rd & Concord Blvd	F	>80	E	72	F	>80	F	>80
Clayton Rd & Ayers Rd	D	52	C	25	E	55	C	28
Clayton Rd & Babel Ln	B	18	B	13	B	18	B	13
Clayton Rd & Bailey Rd	C	34	C	30	C	34	C	30
Clayton Rd & Detroit Ave	A	9	B	12	A	10	B	14
Clayton Rd & Farm Bureau Rd	C	25	B	15	C	25	B	16
Clayton Rd & Gateway Blvd	C	30	F	>80	C	28	F	>80
Clayton Rd & Marsh Creek Rd	C	28	B	11	C	30	B	11
Clayton Rd & Oakhurst Dr	C	35	C	28	C	35	C	29
Clayton Rd & Terry Lynn Ln	C	25	C	29	C	26	C	30
Clayton Rd/Market St & SR-242 Ramps	C	31	D	36	C	32	D	38
Contra Costa Blvd & Concord Ave/ Chilpancingo Pkwy	D	36	D	41	D	37	D	42
Contra Costa Blvd & Gregory Ln/ I-680 SB Off-Ramp	C	31	C	32	C	31	C	32
Contra Costa Blvd NB & I-680 NB Off Ramp	A	9	B	13	A	9	B	14
Contra Costa Blvd & Monument Blvd	C	21	C	29	C	21	C	33
Galindo St & Clayton Rd	C	29	D	48	C	29	D	49
Geary Rd & Pleasant Hill Rd	B	12	B	15	B	13	B	15

Intersection	2019 A.M.		2019 P.M.		2050 A.M.		2050 P.M.	
	Los	Delay	Los	Delay	Los	Delay	Los	Delay
Hillside Ave & I-680 SB On Ramp	A	9	A	5	B	11	A	5
I-680 NB Off Ramp & Rudgear Rd	D	37	F	>80	D	37	F	>80
I-680 NB On Ramp & Elena Ct	B	18	C	28	B	19	C	32
I-680 NB Ramps & Marina Vista Ave	D	50	B	19	E	57	C	23
I-680 NB Ramps & Olympic Blvd	E	70	F	>80	E	78	F	>80
I-680 NB Ramps & Willow Pass Rd	C	23	C	25	C	24	C	31
I-680 SB On Ramp & Rudgear Rd	E	72	D	48.9	E	75	D	50
I-680 SB Ramps & Marina Vista Ave	B	17	C	27	B	18	C	31
I-680 SB Ramps & Olympic Blvd	C	33	C	35	C	33	D	36
I-680 SB Ramps & S Main St	A	3	A	3	A	3	A	3
I-680 SB Ramps & Willow Pass Rd	B	19	B	19	B	19	C	21
Railroad Avenue/Ygnacio Valley Road	F	>80	F	>80	F	>80	F	>80
Marina Vista Ave & Shell Ave	B	16	C	35	B	16	D	47
N Main St & I-680 NB Off Ramp/ Penniman Way	A	9	A	8	A	9	B	12
N Main St & I-680 Ramps/Sunnyvale Ave	D	36	D	41	D	37	D	41
N Main St & Treat Blvd/Geary Rd	E	75	F	>80	F	>80	F	>80
Pacheco Blvd & Blum Rd	D	51	F	>80	D	53	F	>80
Pacheco Blvd & Center Ave	D	51	E	59	F	>80	F	>80
Pacheco Blvd & Golf Club Rd	C	27	C	32	C	27	C	32
Pacheco Blvd & Howe Rd	C	32	E	58	F	>80	F	>80
Pacheco Blvd & Morello Ave	D	41	F	>80	E	58	F	>80
Pacheco Blvd & Muir Rd	F	>80	F	>80	F	>80	F	>80
Pacheco Blvd & Shell Ave	C	22	C	22	F	>80	E	62
SR-242 NB Off Ramp & Olivera Rd	A	9	B	12	A	9	B	12
SR-242 NB On Ramp & Concord Ave	C	23	F	>80	C	31	F	>80
SR-242 NB Ramps & Grant St	B	19	C	34	B	20	C	35
SR-242 SB On Ramp & Concord Ave	E	62	D	40	E	75	E	75
SR-242 SB Ramps & Solano Way	D	40	C	32	D	43	D	41
SR-4 EB Ramps & Center Ave	C	20	C	24	C	21	C	25
SR-4 EB Ramps & Morello Ave	B	12	B	17	B	12	B	18
SR-4 WB Ramps & Arnold Industrial Way	C	26	D	42	D	38	E	60
SR-4 WB Ramps & Center Ave	B	19	B	19	B	19	B	19

Intersection	2019 A.M.		2019 P.M.		2050 A.M.		2050 P.M.	
	Los	Delay	Los	Delay	Los	Delay	Los	Delay
SR-4 WB Ramps & Morello Ave	C	24	B	14	C	26	B	15
SR-4 WB Ramps & Port Chicago Hwy	A	9	B	12	B	10	B	12
Taylor Blvd & Grayson Rd	E	66	C	34	E	66	C	34
Taylor Blvd & Morello Ave/Mercury Way	E	61	E	59	F	>80	F	>80
Taylor Blvd & Pleasant Hill Rd	F	>80	E	66	F	>80	F	>80
Treat Blvd & Bancroft Rd	F	>80	E	69	F	>80	F	>80
Treat Blvd & Buskirk Ave	C	32	D	39	C	32	D	39
Treat Blvd & Clayton Rd	F	>80	F	>80	F	>80	F	>80
Treat Blvd & Cowell Rd	E	74	F	>80	F	>80	F	>80
Treat Blvd & Oak Grove Rd	F	>80	F	>80	F	>80	F	>80
Treat Blvd & Oak Rd	F	>80	F	>80	F	>80	F	>80
Ygnacio Valley Rd & Alberta Way/ Pine Hollow Rd	D	49	F	>80	E	68	F	>80
Ygnacio Valley Rd & Ayers Rd	F	>80	F	>80	F	>80	F	>80
Ygnacio Valley Rd & Civic Dr	D	48	D	50	D	49	D	50
Ygnacio Valley Rd & Clayton Rd	D	53	F	>80	D	54	F	>80
Ygnacio Valley Rd & Cowell Rd/ Montecito Dr	E	59	F	>80	F	>80	F	>80
Ygnacio Valley Rd & N California Blvd	D	50	E	59	D	52	E	78
Ygnacio Valley Rd & Oak Grove Rd	E	57	F	>80	F	>80	F	>80
Ygnacio Valley Rd & Walnut Ave	F	>80	F	>80	F	>80	F	>80
Alhambra Ave & Alhambra Valley Rd	B	16	C	21	B	16	C	21
Alhambra Ave & D St	C	23	B	12	C	28	B	12

Notes: Delay is average control delay reported in seconds.

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Appendix E:

RTO Measurement and Modeling Methodologies

Central County Action Plan

Appendix E: RTO Measurement and Modeling Methodologies

Memorandum

DATE Published July 7, 2022, and Revised in October 2022
TO John Hoang and Matt Kelly, CCTA
FROM David Early and Torina Wilson, PlaceWorks
Erin Vaca, DKS Associates
Julie Morgan and Terence Zhao, Fehr & Peers
SUBJECT Regional Transportation Objectives Methodology Memorandum

This memorandum outlines the Regional Transportation Objectives (RTO) and the underlying methodology that PlaceWorks and its technical consultants (DKS and Fehr & Peers) modeled in preparation of the Contra Costa Transportation Authority (CCTA) Action Plan Updates. These RTOs cover all Action Plan and Countywide Transportation Plan (CTP) topics and were used to evaluate success in achieving the goals of each Action Plan.

Historically, each Regional Transportation Planning Committee (RTPC) has had latitude to select a set of Multimodal Transportation Service Objectives (MTSO) of its own choosing, and the various Action Plans have had differing MTSOs. In this round of Action Plan preparation, each RTPC continues to have the authority to craft its own RTOs. However, PlaceWorks worked with CCTA and the RTPCs to ensure that the new RTOs are as consistent as possible across the Action Plans and can ultimately be combined and consolidated into the future CTP.

The preliminary list of RTOs and their relevant chapter topics are:

- **Transit RTO-1: Transit Mode Share.** Increase the mode share of transit trips in the subregion.
- **Transit RTO-2: Mode Share to BART.** Increase the number of riders who access BART using means other than automobiles, including transit and active transportation.
- **Transit RTO-3: Transit Trip Time.** Optimize peak-hour and peak direction travel time for transit as compared to automobile travel time for the same trip.
- **Transit RTO-4: High Quality Transit Access.** Increase the proportion of urbanized land area in the subregion served by high quality transit.
- **Transit RTO-5: Paratransit Access.** Increase the number of rides by paratransit programs.

- **Active Transportation RTO-1: Increase Active Transportation Mode Share.** Increase the mode share of bicycling and walking in the subregion.
- **Active Transportation RTO-2: Low-Stress Bicycle Network.** Increase the proportion of the countywide low-stress bicycle network (LSBN) completed in the subregion.
- **Active Transportation RTO-3: Unprotected Trail Crossings.** Eliminate the number of locations where the low-stress bicycle network has an unprotected crossing of a heavily traveled vehicle route.
- **Roadways RTO-1: Freeway Delay Index.** Maintain peak-hour delay index on select freeway segments.
- **Roadways RTO-2: Freeway Buffer Index.** Maintain peak-hour freeway segment buffer index on select freeway segments.
- **Roadways RTO-3: Intersection LOS.** Maintain peak-hour LOS at selected intersections in urban areas.
- **Roadways RTO-4: Roadway Segment LOS.** Maintain peak-hour segment LOS on selected two-lane roadways outside of urban areas.
- **Safety RTO-1: KSI Collisions.** Eliminate killed or severely injured (KSI) collisions in the subregion.
- **Safety RTO-2: Active Transportation Collisions.** Eliminate collisions in the subregion that involve users of active transportation.
- **Safety RTO-3: Active Transportation Collisions Near Schools.** Eliminate active transportation collisions within 500 feet of a school.
- **Equity RTO-1: EPC Low-Stress Bicycle Network Completion.** Ensure that the proportion of the countywide LSBN that has been completed in EPCs is equal to or greater than the proportion completed in the subregion as a whole.
- **Equity RTO-2: Collisions in EPCs.** Ensure that the proportion of KSI and active transportation-involved collisions in EPCs in the subregion is equal to or less than the proportion of the subregion's population living in EPCs.
- **Equity RTO-3: EPC Job Access: Driving.** Ensure that the number of jobs that can be reached by EPC residents with a 30-minute drive is equal to or greater than the number of jobs that can be reached with a 30-minute drive by all residents in the subregion.
- **Equity RTO-4: EPC Job Access: Transit.** Ensure that the number of jobs that can be reached by EPC residents with a 45-minute transit trip is equal to or greater than the number of jobs that can be reached with a 45-minute transit trip by all residents in the subregion.
- **Equity RTO-5: EPC Access to High Quality Transit.** Ensure that the proportion of urbanized EPC land area in the subregion served by high-quality transit is equal to or greater than the urbanized land area served by high-quality transit in the subregion as a whole.
- **Climate Change RTO-1: SOV Mode Share.** Reduce the mode share of single-occupant vehicles in the subregion.

- **Climate Change RTO-2: Carpool Mode Share.** Increase the mode share of carpooling in the subregion.
- **Climate Change RTO-3: Vehicle Miles Traveled.** Reduce vehicle miles traveled per capita in the subregion.
- **Climate Change RTO-4: Greenhouse Gas Emissions.** Reduce transportation GHG emissions per capita in the subregion.
- **Climate Change RTO-5: Zero-Emission Vehicles.** Increase ownership of ZEVs in the subregion.
- **Technology and Innovation RTO-1: Signal Interconnection Project.** Complete the project to upgrade traffic signals to regional ethernet and/or fiber optic interconnection.

The remainder of this memo explains the methodologies that the PlaceWorks team used to measure each of these RTOs. These same methodologies will be documented in a revision to CCTA's Technical Procedures and will be available for ongoing assessment of attainment of the RTOs.

The travel demand modelling work described in this memo was completed by DKS using the CCTA Countywide Travel Demand Model. This four-step, trip-based model was most recently revalidated to a 2018 base year. The standard CCTA travel demand model incorporates land use (population and employment) forecasts for 2020, 2030, and 2040 and can interpolate these inputs for interim years. Because the standard model cannot produce scenarios beyond 2040, a special version of the model script was developed for the Action Plan analyses. In addition to accommodating a year 2050 horizon, the revised version incorporated enhanced traffic assignment procedures for freeway express lanes.

For the Action Plan updates, land use inputs for the horizon year of 2050 were developed based on the Metropolitan Transportation Commission (MTC) Plan Bay Area 2050 projections for Contra Costa County. The transportation network assumed the Baseline 2050 scenario was derived from the CCTA Transportation Expenditure Plan (TEP) No Build scenario, to reflect only already-programmed improvements. In addition to the TEP projects, some additional projects were programmed from the Tri-Valley TVTC Nexus Study. These include express lanes assumed on Interstate (I-) 680, consistent with CCTA's Innovate 680 program, and removal of the extension of the Bay Area Rapid Transit (BART) service to Livermore. Going forward, it will be important to coordinate with ACTC, LAVTA, and other Alameda County agencies to incorporate planned (or funded) transportation infrastructure improvements and transit service enhancements into any modeling and analyses. This coordination should occur through the TVTC Technical Advisory Committees and Policy Board, and all local agencies should be actively involved in cooperative coordination on project implementation.

For existing conditions, the project team selected 2019 data to reflect pre-pandemic conditions, as it is not possible to predict how traffic conditions might stabilize as the post-pandemic "new normal" continues to evolve.

Transit RTOs

Transit RTO-1: Transit Mode Share

Increase the mode share of transit trips in the subregion.

Mode share was estimated for the Action Plan updates, both for transit (which is the focus of this section) and for the bicycle/pedestrian and climate change topics (as explained in later sections of this memo).

For the Action Plan analysis, mode share in each subregion was estimated using data collected by the American Community Survey (ACS), as published by the Census Bureau, and travel demand model outputs.

For current conditions, the PlaceWorks team reported ACS data, which provides mode share estimates for work commute trips for workers 16 years of age and over. The current data release includes one-year estimates for 2019, which was reported in the Action Plans. Mode share for all trips and all modes was modeled using outputs from the CCTA Countywide Travel Demand Model. Specifically, the person trip tables from the mode choice step of the model were aggregated to calculate mode share by geographic subarea. These trip tables are in “production-attraction” format, meaning that trips are tabulated based on the zone of production (location of residence for all home-based trip purposes) and zone of attraction (work or other location) rather than representing directional trips.

The CCTA Countywide Travel Demand Model produces person trip matrices by mode by Traffic Analysis Zone (TAZ) for each trip purpose and income quartile. Scripts were developed to summarize this data by RTPC and mode. Most mode share RTOs were summarized by the geographic area of production, but the home-based work trip mode share was summarized by the attraction zone as well.

Mode shares were calculated for the 2019 base year and 2050 baseline scenarios. The mode alternatives specified in CCTA Countywide Travel Demand Model include:²⁹

- ▣ Drive Alone
- ▣ Shared Ride 2 Occupants
- ▣ Shared Ride 3+ Occupants
- ▣ Transit with Walk Access
- ▣ Transit with Drive Access
- ▣ Bicycle
- ▣ Walk

²⁹ Mode share in the Tri-Valley Action Plan was calculated using a combination of the CCTA Countywide Travel Demand Model and additional ACS data to assess the entire “Planning Area” which include Contra Costa County and the Alameda County portion of the Tri-Valley area.

The summary tables and charts for these modes report mode share for the subregion of production (all trips), for commute mode share by subregion of production (home-based work trips only), and for commute mode share by subregion of attraction or job location (home-based work trips only).

Transit RTO-2 Mode Share to BART

Increase the number of riders who access BART using means other than automobiles, including transit and active transportation.

This RTO is intended to assess accessibility to BART using transit and active transportation. MTC conducts a regional survey every 7 to 10 years of riders across all stations to gather data on travel mode used to access transit stations (including BART stations). The project team gathered the data from MTC/BART and aggregated the results for the stations in Contra Costa County and the Alameda County portion of the Tri-Valley, grouping them by the five subregions. Subsequently, the team analyzed the results to determine the mode share for accessing BART (transit, active transportation, or automobiles).

Transit RTO-3: Transit Trip Time

Optimize peak-hour and peak direction travel time for transit as compared to automobile travel time for the same trip.

This RTO is intended to measure the difference in travel time for a motorist as compared to a transit user. The origin-destination pairs shown in Table E-1 were selected for this metric. Travel times were developed for each mode based on both the peak-commute and reverse-commute directions of travel for the morning and afternoon peak periods.

Table E-1. Corridors for Transit-Auto Travel Time Comparison

Subarea	Origin-Destination Pairs
West County	Richmond BART and Contra Costa Center (Pleasant Hill BART station) Hercules Transit Center and Salesforce Transit Center in San Francisco Contra Costa College and 14th Street/Broadway in Oakland
Central County	Walnut Creek BART station and Montgomery Street BART station Walnut Creek BART and San Ramon Transit Center Dublin BART and San Ramon Transit Center
East County	Antioch BART station and 12th Street (Oakland) BART station
Lamorinda	Orinda BART station and Montgomery Street (San Francisco) BART station
Tri-Valley	ACE Vasco Station and San Jose Diridon station Dublin-Pleasanton BART station and Montgomery Street (San Francisco) BART station Downtown Livermore and Dublin/Pleasanton BART Dublin/Pleasanton BART and Bishop Ranch San Ramon and BART Walnut Creek Dublin BART and San Ramon Transit Center

Transit travel times along key routes were based on published transit schedules. Bus schedules are assumed to account for expected roadway congestion that would impact bus routes. Driving travel times were derived from INRIX roadway analytics for weekdays (Tuesday to Thursday) for April 2019. The forecasted driving travel times for 2050 were derived from the CCTA Countywide Travel Demand Model, using peak-period drive-alone automobile travel times between all TAZs. Because the model's transit travel times are not accessible in an interpretable format, it was assumed that the transit frequency and travel times would remain constant between 2019 and 2050.

Transit RTO-4: High Quality Transit Access

Increase the proportion of urbanized land area in the subregion served by high quality transit.

This RTO assesses the percentage of urban land that has access to high quality transit by walking and bicycling. The project team used GIS to map the distribution of high frequency transit stops³⁰ in the five subareas and identified the high quality transit zones, or areas within a ¼-mile radius of each of the stations. Additionally, the team mapped all rail and ferry stations and identified areas within a ½-mile radius around each station. The project team summed the high quality transit zone areas in acres and subtracted it from the total acreage of urban land in the subregion; the result was the percentage of urban land within walking or bicycling distance to high quality transit.

Transit RTO-5: Paratransit and Community Based Transportation Programs Access

Increase the number of rides by paratransit and community based transportation programs.

This RTO assesses the demand for paratransit³¹ and community based transportation program services. The project team estimated paratransit demand by aggregating the number of trips in 2019 from ADA-mandated and non-ADA-mandated paratransit/accessible transportation providers in the county (from their Accessible Transportation Strategic Plan). The project team recognizes that this metric is not the most efficient way to track access and use of paratransit services, particularly for agencies that encourage elderly and disabled groups to use fixed-route or other transportation services. However, this metric begins the conversation of tracking accessible transportation in the Action Plans.

³⁰ High frequency transit stops are those with headway frequency of 15 minutes or fewer.

³¹ Paratransit programs are individualized transit services without fixed routes or timetables that supplement mass transit services.

Active Transportation RTOs

Active transportation RTOs are based on the countywide Low-Stress Bicycle Network (LSBN) adopted in the 2018 CCTA Countywide Bicycle and Pedestrian Plan. This network consists of existing and planned Class 1 bicycle paths and Class 4 cycle tracks throughout Contra Costa County. The project team identified low stress facilities in the Alameda County portion of the Tri-Valley area by reviewing the Alameda CTC Active Transportation Plan and the MTC active transportation facility webmap.

Active Transportation RTO-1: Increase Active Transportation Mode Share

Increase the mode share of bicycling and walking in the subregion.

The methodology for this RTO was identical to the methodology for the “Mode Share of Transit Trips” RTO. See the previous section for more details.

Active Transportation RTO-2: Low-Stress Bicycle Network

Increase the proportion of the countywide low stress bicycle network completed in the subregion

The LSBN is a component of the CCTA CBPP adopted in 2018.³² The CBPP introduced a new way of evaluating a facility’s “Level of Traffic Stress,” in which roadways are evaluated on several factors, including, but not limited to, the speed and number of vehicles and presence and width of bicycle facilities. Facilities are given a rating from one (least stressful) to four (most stressful) to evaluate the stress a bicycle rider will experience. The goal of the 2018 CBPP is to ensure the countywide bicycle network is complete and rated either Level of Traffic Stress 1 (most children can feel safe riding on these facilities) or Level of Traffic Stress 2 (The “interested but concerned” adult population will feel safe riding on these facilities). Ultimately, construction of the entire LSBN would result in an increase in bicycle mode share and a reduction in KSI collisions. It is assumed that the LSBN includes only Class I and Class IV facilities.

For this RTO, the project team updated the LSBN map to reflect any portions that have been constructed since the 2018 CBPP and map adoption. Once the LSBN was updated, the number of total miles in the network at buildout was calculated and compared with the total miles already completed.

³² The project team identified low stress facilities in the Alameda County portion of the Tri-Valley area by reviewing the Alameda CTC Active Transportation Plan and the MTC active transportation facility webmap.

Active Transportation RTO-3: Unprotected Trail Crossings

Eliminate the number of locations where the low-stress bicycle network has an unprotected crossing of a heavily traveled vehicle route.

PlaceWorks created an ArcGIS point data set to identify each location where the LSBN (Class I and Class IV facilities) crosses a vehicle roadway. Then we ranked the crossing by how protected it is using Google Maps.

- **Fully protected** by grade separation or a signalized intersection with cyclist protections.
- **Semi-protected** at an at-grade crossing with a beacon system, or with a signal but without cyclist protections.
- **Unprotected** at an at-grade crossing, which includes none of the improvements listed above.

This exercise was conducted for low-stress bicycleway crossings of all arterials and major collectors in each subarea. The types of roadways included in this exercise were interstates, freeways, expressways, other principal arterials, minor arterials, and major collectors. The only roadways not included in this exercise were minor collectors and local routes.

Roadway RTOs

Roadways RTO-1: Freeway Delay Index

Maintain peak-hour delay index on select freeway segments.

The delay index is a measure of delay experienced by motorists on a roadway segment during a peak commute hour in a single direction. The delay index is calculated by measuring the time it takes to travel a segment of road during average peak-period congested conditions and comparing it to the time it takes to travel the same segment during uncongested, free-flow conditions. A delay index may also be calculated as the ratio of congested speed to uncongested speed, given that the distance is fixed on any given corridor.

All previous CCTA Action Plans used delay index as MTSOs for freeway facilities. TableE-2 lists the specific facilities to be evaluated with this metric for the current Action Plan updates; these segments are mapped in Figure E-1. While the performance targets used in the previous round of Action Plans are provided for reference, revised targets have been developed as part of the current planning process.

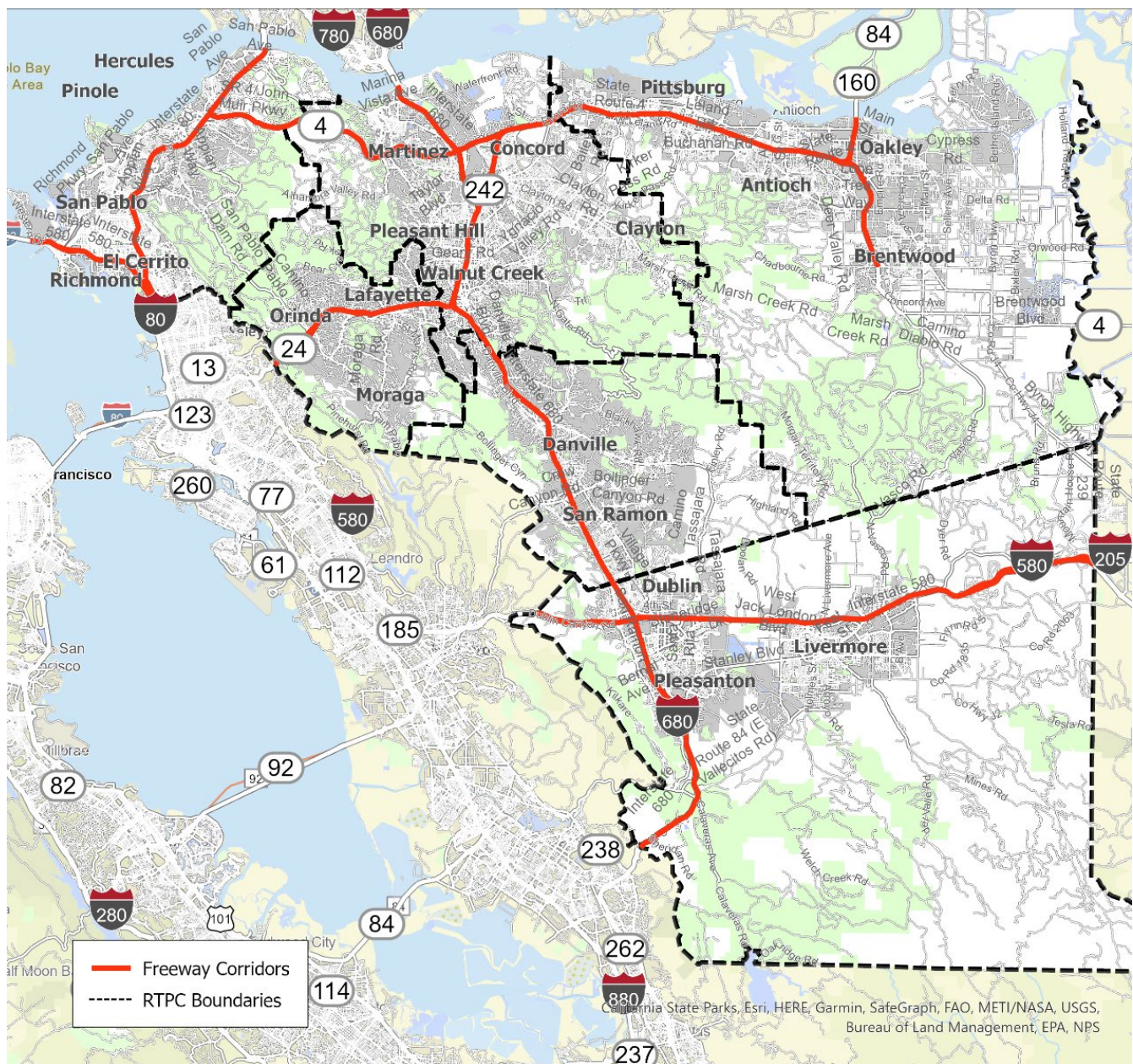
Table E-2. Freeway Facilities and Previous Performance Targets

RTPC	Facility	From	To	Previous Performance Target
WCCTAC (West County)	Interstate 80	Carquinez Bridge	Solano County Line	DI*≤3.0
	Interstate 580	I-80	Marin County Line	DI≤2.5
	State Route 4	I-80	Cummings Skyway	DI≤2.0
TRANSPAC (Central County)	Interstate 680	Benicia Martinez Bridge	I-680/SR-24 Interchange	DI≤ 4.0 (I-680)
	Interstate 680	I-680/SR-24 Interchange	Livorna Road	DI≤ 4.0 (I-680)
	State Route 242	SR-4/WO Port Chicago Highway	I-680/SO Willow Pass Road	DI≤ 3.0 (SR-242)
	State Route 4	Cummings Skyway	Willow Pass Road/Evora Road	DI≤ 5.0 (SR-4)
TRANSPLAN (East County)	State Route 4	Willow Pass Grade	Balfour Road	DI≤2.5
	State Route 160	SR-4	Sacramento County Line	DI≤2.5
Lamorinda (Southwest County)	State Route 24	Caldecott Tunnel	I-680	DI≤2.0
Tri-Valley (Southwest County)	Interstate 680	Livorna Road	I-580	DI≤2.0
	Interstate 680	I-580	SR-80	DI≤2.0
	Interstate 580	Eden Canyon Road	I-680	DI≤2.0
	Interstate 580	I-680	N Midway Road	DI≤2.0

Source: RTPC Action Plans.

* DI = Delay index

Figure E-1. Freeway Facilities



The delay index (and the related average speed) were calculated for both the 2019 Base Year and 2050 Baseline scenarios, pivoting from observed data. The source of observed data for this RTO was speed data from INRIX Roadway Analytics, which was also used in the 2017 MTSO monitoring³³ and 2021 Congestion Management Plan (CMP) monitoring.³⁴ Observed 2019 speeds and travel times were calculated with INRIX data using April 2019 as a baseline. DKS downloaded one-minute interval data including travel time for all segments in Alameda and Contra Costa Counties. These data were processed using a Python program to excerpt defined study areas from Table E-1 and Figure E-1, and filter holidays, defined peak hours, defined days of the week, and data points affected by construction and special events, or with low INRIX quality scores.

Baseline 2050 delay indices were forecast using the CCTA Countywide Travel Demand Model peak period traffic assignments by estimating the additional congested travel time that is expected on each segment of the study corridors. Components of this work included:

- ▣ Calculate average congested speed for 2019 was derived from INRIX Roadway Analytics for each segment (typically defined from one on ramp to the following off ramp).
- ▣ Obtain peak period congested speeds for 2019 and 2050 from the travel demand model for the same segments (note: free-flow speed is taken as the posted speed limit).
- ▣ Where the observed 2019 speed is lower than the modeled 2019 speed, scale the 2050 modeled speed by this ratio to calculate the corresponding delay index.

These calculations yielded existing and future delay index ratings for the segments of freeways listed in Table E-1. Existing delay index ratings were compared to adopted MTSO delay index thresholds, and the project team suggested revisions to the existing delay index thresholds for consideration by the RTPCs.

Roadways RTO-2: Freeway Buffer Index

Maintain peak-hour freeway segment buffer index on select freeway segments.

The “buffer index” metric is intended to measure reliability and relies on the same INRIX data pulled for the delay index RTO. The buffer index represents the extra buffer time (or time cushion) that most travelers add to their average travel time when planning trips to ensure on-time arrival. This extra time is added to account for any unexpected delay. The buffer index is expressed as a percentage and its value increases as reliability gets worse. For example, a buffer index of 40 percent means that, for a 20-minute average travel time, a traveler should budget an additional 8 minutes (20 minutes × 40 percent = 8 minutes) to ensure on-time arrival most of the time. In this example, the 8 extra minutes are called the buffer time.

³³ Contra Costa Sub-regional Action Plans for the Routes of Regional Significance Multimodal Traffic Service Objectives (MTSO) Draft 2017 Monitoring Report (March 2018).

³⁴ 2021 Update of the Contra Costa Congestion Management Program (Draft Final Report).

The CCTA Countywide Travel Demand Model can output only average congested speeds and not 95th percentile speeds, so the buffer index is a monitoring metric, compiled for existing and observed conditions but not forecasts. The buffer index for each freeway corridor listed in The observed baseline and modeled results for freeway delay index on the freeway RRS are shown in Table 7-2. As shown, freeway corridors with especially high levels of delay (greater than 1.5 delay index) include I-680 south of SR-24 (northbound in the p.m. and southbound in the a.m.) and SR-242 (northbound in the p.m.), and SR-4 (eastbound in the p.m.). The modeled condition for 2050 shows similar patterns.

Based on current performance and the future modeled performance, this Action Plan proposes the same delay index standards as the 2017 Central County Action Plan, at less than or equal to 4.0 for I-680, less than or equal to 3.0 for SR-242, and less than or equal to 5.0 for SR-4.

Roadways RTO-3: Intersection LOS

Maintain peak-hour LOS at selected intersections in urban areas.

Peak-hour intersection LOS was calculated for selected signalized intersections along the defined RRS in urban areas. Signalized LOS is a delay-based qualitative measure of traffic conditions. LOS is expressed in ratings from “A” through “F,” with “A” meaning that all traffic clears the intersection in every cycle and “F” meaning that drivers must wait through multiple cycles to clear the intersection.

Signalized intersection LOS was determined based on intersection turning movement counts (also called turning/traffic volumes), intersection geometry, and signal timing data, where available. The CCTA Technical Procedures specify that methods documented in the latest edition of the Highway Capacity Manual be used to measure signalized intersection LOS.³⁵ The relationship between average delay and LOS is shown in Table E-3.

Table E-3. Intersection LOS Definitions

Delay (Second/Vehicle)	Level of Service
≤10	A
> 10–20	B
> 20–35	C
> 35–55	D
> 55–80	E
> 80	F

Source: Highway Capacity Manual, 6th Edition, Exhibit 19-8.

³⁵ The 6th edition of the Highway Capacity Manual was published by the Transportation Research Board in January 2022.

The facilities evaluated using signalized intersection LOS or other intersection operational metrics in the previous round of Action Plans are listed in Table E-4. The performance of these Action Plan intersections and some additional locations was monitored in 2017. In addition, a subset of these intersections is regularly monitored as part of the Congestion Management Program, most recently in 2021. For all previously monitored intersections, intersection operational models have been built, and peak hour turning movement counts were collected to represent 2013, 2017, or 2021 conditions. Table E-5 summarizes the available data for intersection analysis.

Since the previous rounds of Action Plans and monitoring, some previously non-urban highway segments have been developed into signalized arterial corridors, and some roadways have been newly designated as RRS, potentially adding numerous additional signalized intersection locations to be analyzed. A small number of previously monitored intersections appear to fall on roadway facilities that are no longer proposed as RRS for this round of Action Plan updates.

For this analysis of 2019 and 2050 baseline conditions, the project team only reported on key locations, such as at the intersections of two RRS facilities, freeway ramp terminals, and intersections of local concern, as depicted in Figure E-2 through Figure E-6. In total, 343 intersections were analyzed for 2019 and 2050.

Table E-4. Signalized Intersection Level of Service: Previous Action Plans

RTPC	Arterial Facility	Previously Used Performance Target and Number of Intersections
WCCTAC (West County)	<ul style="list-style-type: none"> ▣ Appian Way ▣ Carlson Boulevard ▣ Central Avenue ▣ Cummings Skyway ▣ Interstate 580 (I-580) ▣ Richmond Parkway ▣ San Pablo Avenue ▣ San Pablo Dam Road ▣ State Route 4 (SR-4) ▣ 23rd Street 	LOS D on all intersections except for San Pablo Avenue and San Pablo Dam Road where LOS E is acceptable.
TRANSPAC (Central County)	<ul style="list-style-type: none"> ▣ Alhambra Avenue ▣ Bailey Road ▣ Clayton Road ▣ Contra Costa Boulevard ▣ Geary Road ▣ North Main Street ▣ Pacheco Boulevard ▣ Pleasant Hill Road ▣ Taylor Boulevard ▣ Treat Boulevard ▣ Ygnacio Valley Road/Kirker Pass Road 	LOS F on all intersections. ^a

RTPC	Arterial Facility	Previously Used Performance Target and Number of Intersections
TRANSPLAN (East County)	<ul style="list-style-type: none"> Auto Center Drive Bailey Road Balfour Road Brentwood Boulevard/Main Street Buchanan Road Deer Valley Road (improved portion) East 10th Street/Harbor Street (in Pittsburg) East 18th Street Fairview Avenue Hillcrest Avenue James Donlon Boulevard (including future extension) Laurel Road Leland Road (both West and East)/Delta Fair Boulevard Lone Tree Way/A Street Oak Street/Walnut Boulevard (within Brentwood) Ninth Street/Tenth Street (in Antioch) Pittsburg-Antioch Highway Railroad Avenue/Kirker Pass Road Sand Creek Road/Dallas Ranch Road Somersville Road Wilbur Avenue Willow Pass Road 	LOS D on all intersections except for Bailey Road where LOS E is acceptable.
Lamorinda (LPMC and Southwest County)	<ul style="list-style-type: none"> Camino Pablo/San Pablo Dam Road Pleasant Hill Road 	Side Street Delay, no LOS rating.
Tri-Valley (TVTC and Southwest County)	<ul style="list-style-type: none"> Alcosta Boulevard Bernal Avenue Bollinger Canyon Road Camino Tassajara Danville Boulevard Dougherty Road Dublin Boulevard Fallon Road First Street/Railroad Avenue Hopyard Road 	LOS E on all intersections except no standard for intersections in downtown areas and those exempt by General Plans.

RTPC	Arterial Facility	Previously Used Performance Target and Number of Intersections
	<ul style="list-style-type: none"> ▣ Iron Horse Trail ▣ Jack London Boulevard ▣ San Ramon Road ▣ San Ramon Valley Boulevard ▣ Santa Rita Road ▣ Stanley Boulevard ▣ Stoneridge Drive ▣ Sunol Boulevard ▣ Sycamore Valley Road ▣ Tassajara Road ▣ Vasco Road 	

Source: RTPC Action Plans

^a. Other TRANSPAC intersection performance targets are defined by volume to capacity (V/C) ratios or the number of cycles.

Table E-5. Signalized Intersections and Available Intersection Data

Region	Previous Action Plans	2017 Monitoring	2021 CMP	Total Signalized Intersections on RRS	Total Selected for Existing and Baseline Scenarios
Central County	54	29	27	183	76
East County	41	41	9	233	83
Lamorinda	13	12	1	47	12
Tri-Valley	151	29		301	91
West County	40	58	23	172	81
Total	299	169	60	936	343

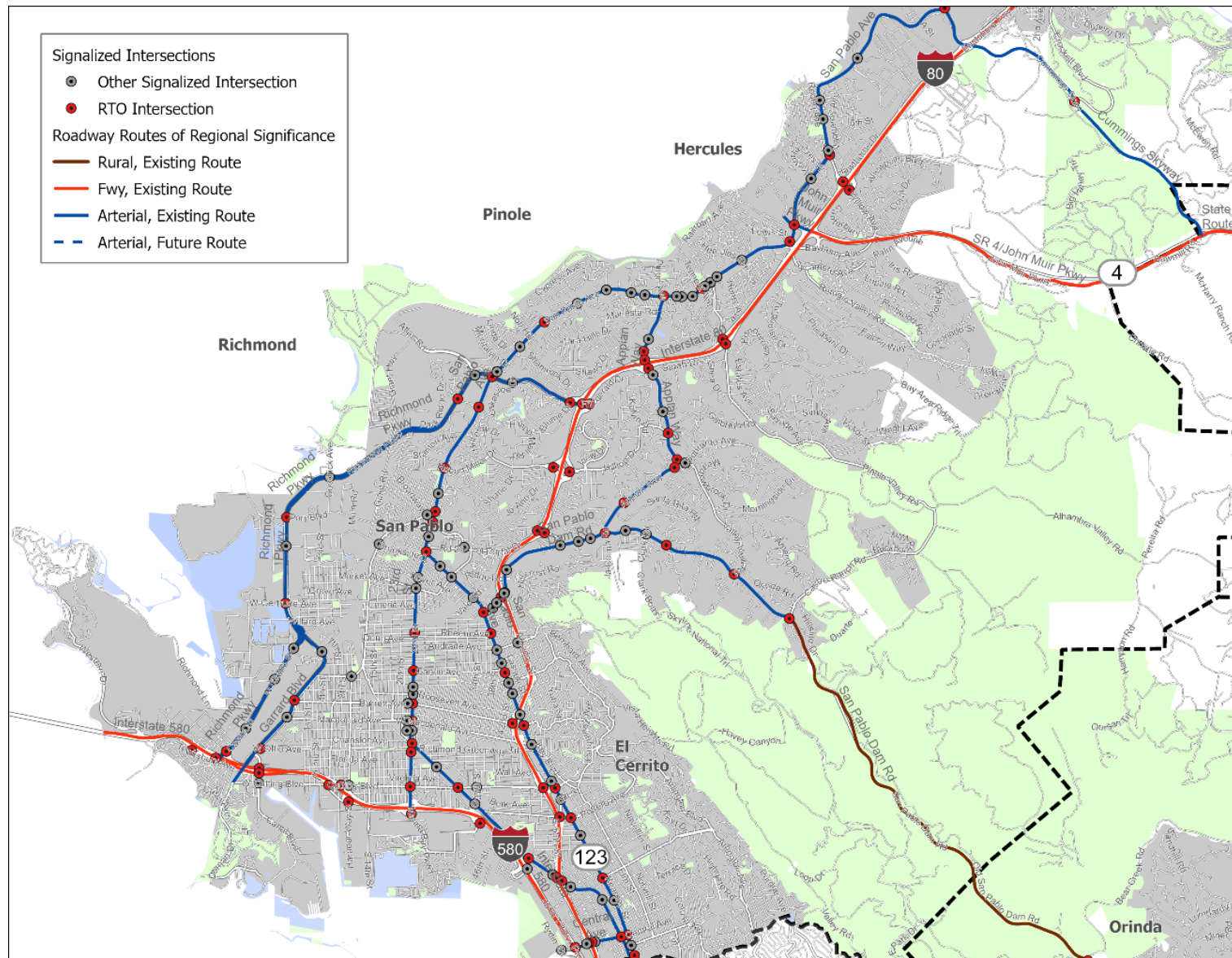


Figure E-3. Arterial Intersections and Roadway RRS (Central County)

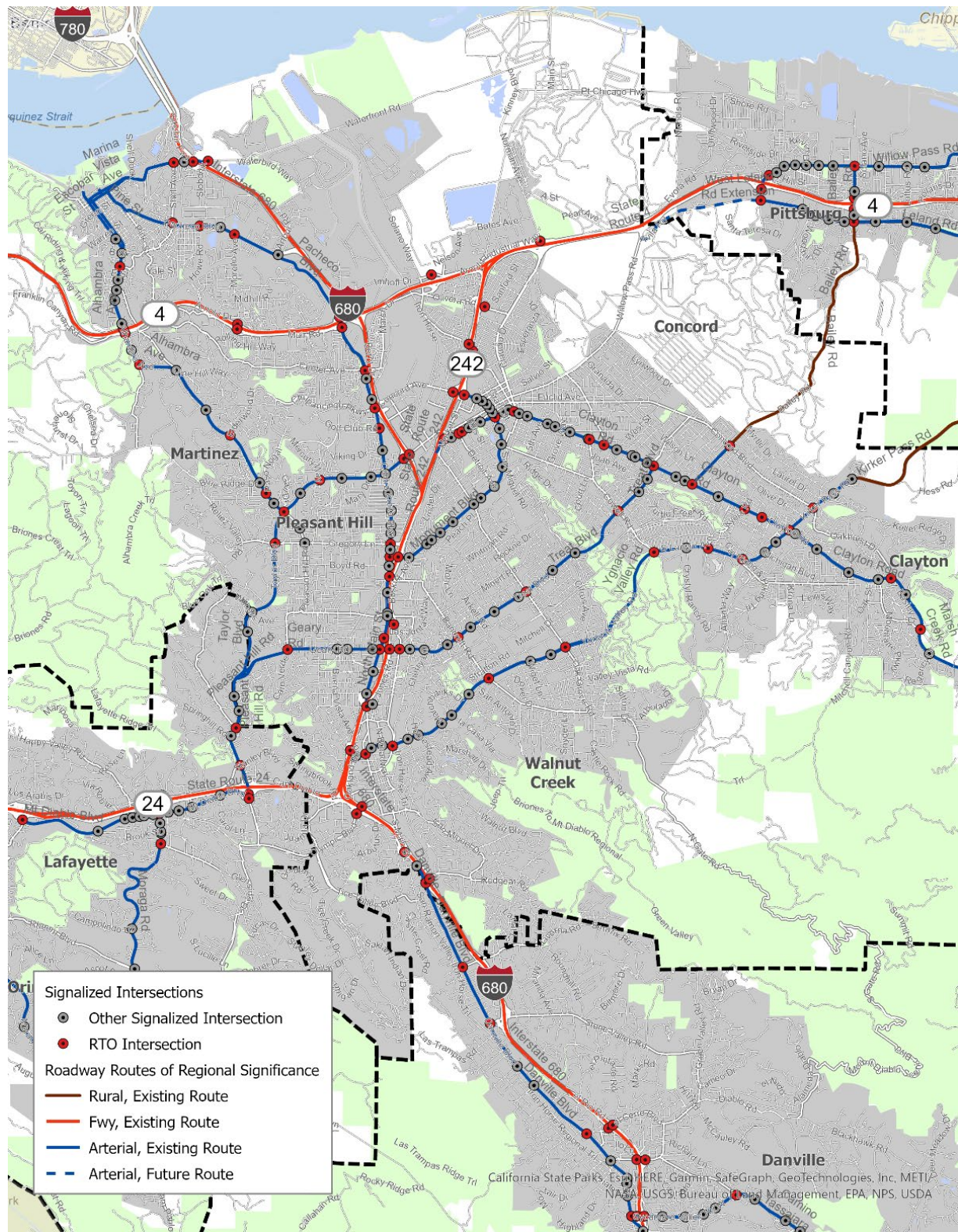
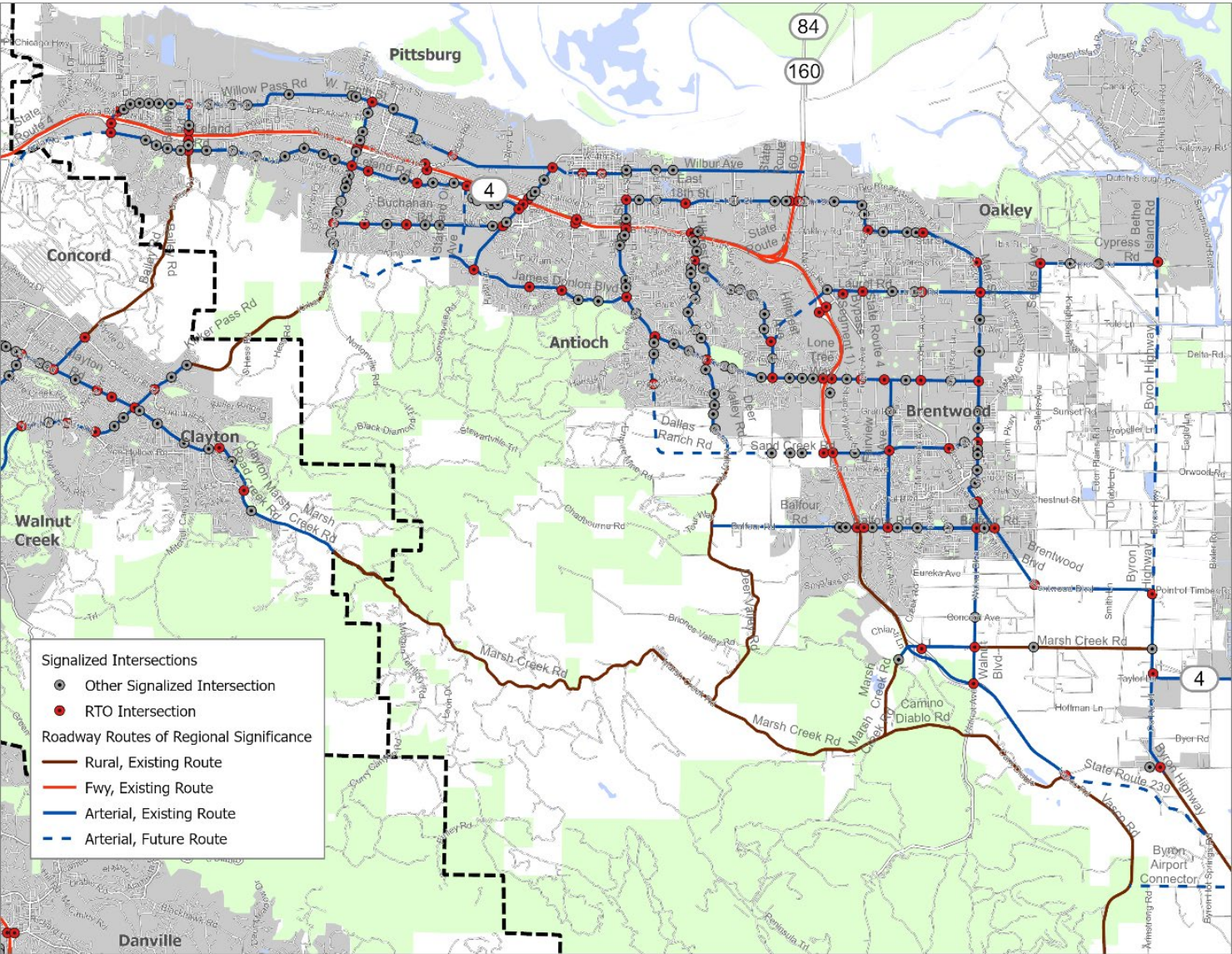
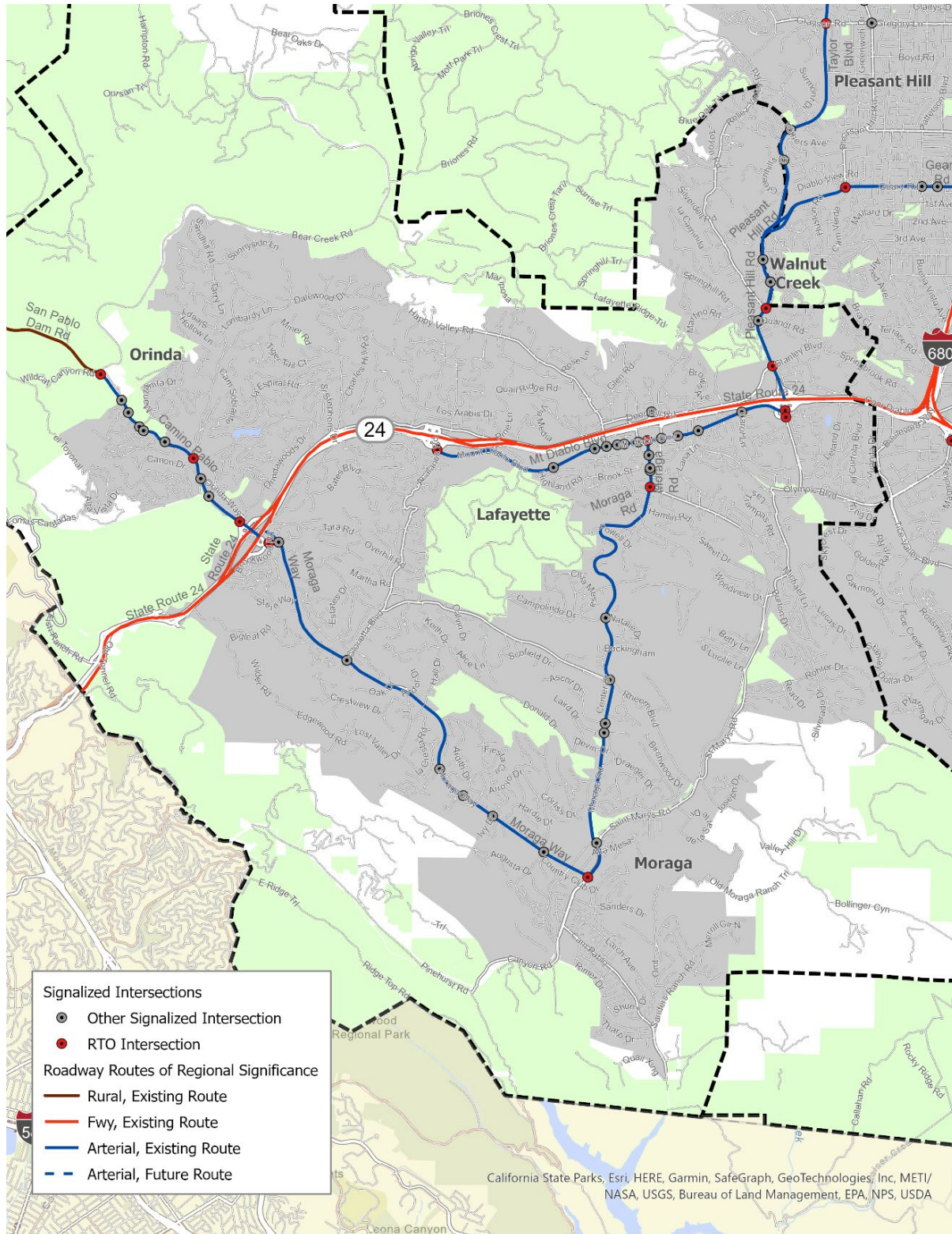


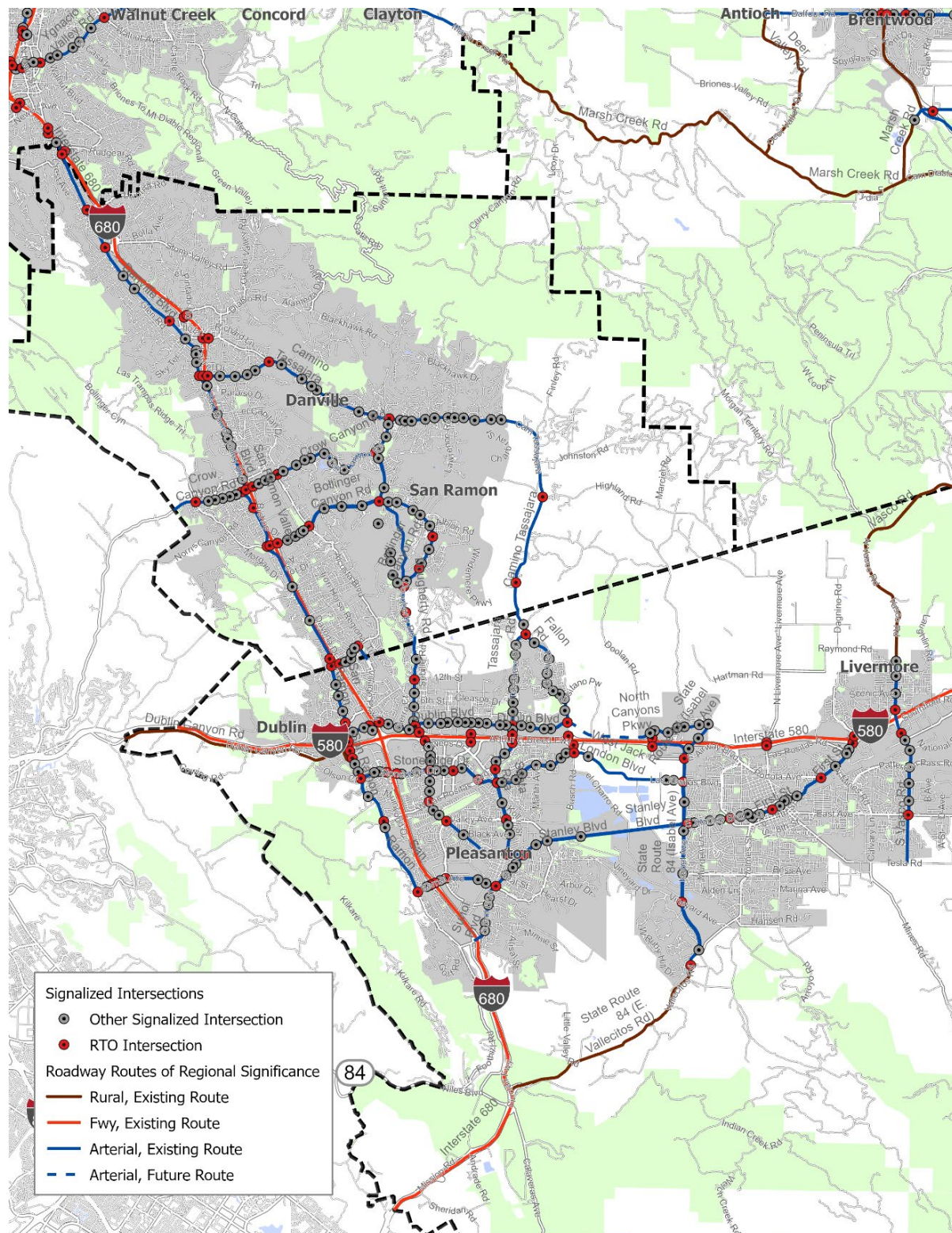
Figure E-4. Arterial Intersections and Roadway RRS (East County)



**Figure E-5. Arterial Intersections and Roadway RRS
(Southwest County – Lamorinda)**



**Figure E-6. Arterial Intersections and Roadway RRS
(Southwest County – Tri-Valley)**



The methodology for calculating signalized intersection LOS followed standard practice. Where available, observed counts were extracted from the operational models built for the 2017 MTSO monitoring and the 2021 CMP monitoring. For the additional intersections analyzed for this round of Action Plans, historical turning volume estimates were obtained from the Streetlight data subscription maintained by CCTA. The Streetlight data represent a spring 2019 weekday condition excluding holidays.

Peak-hour traffic volumes for the base year and future year were estimated using the Furness process specified in the CCTA Technical Procedures and summarized here. This process develops intersection turning movement forecasts using observed counts and model outputs, as follows:

- Calculate the Model Correction Volume for each network link (i.e., the difference between the projected peak-hour volume for the validation (base year) run and actual peak-hour traffic volumes).
- Determine the forecast peak-hour approach and departure volumes for each study intersection by adding the Model Correction Volume to the model output.
- Develop intersection turning movement volumes that are consistent with the approach and departure volumes by balancing projected intersection turning movements with actual turning movement volumes using an iterative process.
- Check reasonableness by comparing adjusted intersection turning movement volumes with both the existing count data and the raw model output.
- Review volume adjustments that do not appear reasonable and, if appropriate, revise adjustments.

Intersection geometry was derived or checked using Google Earth and timing plans requested for any newly added intersection locations. In the absence of local timing plans, optimized timing settings were applied.

Signalized intersection LOS was assessed by implementing Highway Capacity Manual (HCM) methods in the Trafficware Synchro ("Synchro") software package.³⁶ The outcome of this modeling yielded a list of all intersections and their baseline 2019 and projected 2050 LOS ratings.

Roadways RTO-4: Roadway Segment LOS

Maintain peak-hour segment LOS on selected two-lane roadways outside of urban areas.

LOS was analyzed for specific segments on non-urban roadways. Roadway segment LOS is a measure of traffic efficiency and smoothness of flow along roadway segments that are not constrained by a nearby traffic signal. This has previously been calculated for the East County in accordance with the methods specified in the 2010 HCM using average speed for Class I highways, which are two-lane facilities in non-urban areas that motorists expect to traverse at relatively high speed.

³⁶ The latest HCM (7th ed.) was released in February 2022 and is not yet implemented in Synchro, so Synchro reports signalized intersection delay and LOS based on the HCM 6th edition (there is no significant difference for the analysis of signalized intersections).

DKS ran LOS analysis for the roadway segments as listed in Table E-6 and shown in Figures E-2 through E-6.

Table E-6. Two-Lane Non-Urban Roadway Corridors

Subarea	Facility	From	To
West County	San Pablo Dam Road	Castro Ranch Road RTPC Boundary	RTPC Boundary Wildcat Canyon
Central County	Bailey Road	Concord Boulevard	RTPC Boundary
	Kirker Pass Road	RTPC Boundary	James Donlon Boulevard
	Kirker Pass Road	Clearbrook Drive	RTPC Boundary
East County	Byron Highway	State Route 4	Alameda County
	Camino Diablo Road	Marsh Creek Road	Vasco Road
	Marsh Creek Road	Deer Valley Road	Vineyard Parkway
	Vasco Road	Walnut Boulevard	Alameda County
	Bailey Road	Leland Avenue	RTPC Boundary
	State Route 4 Bypass	Balfour Road	Marsh Creek Road
	Deer Valley Road	Sand Creek Road	Marsh Creek Road
	Marsh Creek Road	RTPC Boundary	Deer Valley Road
Lamorinda	San Pablo Dam Road	RTPC Boundary	Wildcat Canyon
Tri-Valley	State Route 84 (E. Vallecitos Road)	Interstate 680	Ruby Hill Drive
	Dublin Canyon Road	Palo Verde Road	Foothill Road
	Vasco Road	Alameda County	Dalton Avenue

The latest edition of HCM (7th edition) specifies a new version for calculating segment LOS, which requires substantially more data than the previous HCM 6th edition/2010 approach. The new approach requires information on passing constraint condition (none, passing lane, or passing constrained), flow rate (vehicles per hour), percentage heavy vehicles, vertical slope (five classifications based on segment length and slope), and horizontal curvature (five classifications based on curve radius and superelevation). Since these data are not available for the segments to be studied, the Action Plan updates retained the HCM 6th edition approach, which simply relates LOS to average speed, as shown in Table E-7. For this analysis, DKS used the travel demand model to predict congested speed for all segments to be analyzed.

Table E-7. LOS for Two-Lane Non-urban Roadways

Level of Service	Average Speed (Miles per Hour)
A	>55
B	>50–55
C	>45–50
D	>40–45
E	≤40

Source: *Highway Capacity Manual, 2010, Exhibit 15-3.*

Safety RTOs

Safety RTO-1: KSI Collisions

Eliminate killed or severely injured (KSI) collisions in the subregion.

DKS obtained KSI collisions data for the Planning Area from the Transportation Injury Mapping System (TIMS)³⁷ as the basis for the safety RTOs. TIMS collision records represent cleaned and geocoded data compiled by the Statewide Integrated Traffic Records System (SWITRS) maintained by the California Highway Patrol. Collision recode geocoding was reviewed for accuracy, and any obviously miscoded records were removed or recoded. Collision records were downloaded for the period spanning January 1, 2016, through December 31, 2019, and loaded into a Geographic Information System for further processing by planning subregion.

Safety RTO-2: Active Transportation Collisions

Eliminate collisions in the subregion that involve users of active transportation.

The number of active transportation collisions was developed using the same TIMS data set described above. The active transportation KSI collisions were then tabulated and mapped by planning subregion.

³⁷ Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley, 2022.

Safety RTO-3: Active Transportation Collisions Near Schools

Eliminate active transportation collisions within 500 feet of a school.

This RTO was developed using the same TIMS data set described previously. The project team used GIS school site polygon data to create a 500-foot buffer around school sites and determined which of the geocoded collisions occurred within these school site buffers. The resulting data were tabulated and mapped by subregion. The records identified through GIS analysis were individually reviewed to confirm that the collisions involved students using active transportation.

Equity RTOs

Equity RTO-1: EPC Low-Stress Bicycle Network Completion

Ensure that the proportion of the countywide LSBN that has been completed in EPCs is equal to or greater than the proportion completed in the subregion as a whole.

The methodology for this RTO is identical to that of Active Transportation RTO-2, except that it applies specifically to EPC areas. Facilities in the EPC areas are given a rating from one (least stressful) to four (most stressful) to evaluate the stress a bicycle rider will experience. The goal of the 2018 CBPP is to ensure the countywide bicycle network is complete and rated either Level of Traffic Stress 1 (most children can feel safe riding on these facilities) or Level of Traffic Stress 2 (The “interested but concerned” adult population will feel safe riding on these facilities). Ultimately, construction of the entire LSBN would result in an increase in bicycle mode share and a reduction in KSI collisions. It is assumed that the LSBN includes only Class I and Class IV facilities.

For this RTO, the project team updated the LSBN map to reflect any portions that have been constructed since the 2018 CBPP and map adoption.³⁸ Once the LSBN was updated, the number of total miles in the network upon buildout was calculated and compared with the total miles already completed.

Equity RTO-2: Collisions in EPCs

Ensure that the proportion of KSI and active transportation-involved collisions in EPCs in the subregion is equal to or less than the proportion of the subregion’s population living in EPCs.

This RTO was developed using the same TIMS data set described for the Safety RTOs. Using GIS, this analysis mapped the boundaries of identified EPCs. For each subregion and the county as a whole, the average annual rate of KSI and active transportation collisions per population was calculated for the

³⁸ The project team identified low-stress facilities in the Alameda County portion of the Tri-Valley area by reviewing the Alameda CTC Active Transportation Plan and the MTC active transportation facility webmap.

EPCs as well as each planning subregion and the Planning Area as a whole. To develop these metrics, population estimates at the block group level were taken from the American Community Survey 2019 Five Year Estimates, Table B01003. This RTO was not tracked in Action Plans that do not contain EPCs, including Tri-Valley and Lamorinda.

Equity RTO-3: EPC Job Access: Driving

Ensure that the number of jobs that can be reached by EPC residents with a 30-minute drive is equal to or greater than the number of jobs that can be reached with a 30-minute drive by all residents in the subregion.

The travel demand model's map of TAZs was compared to identified EPCs in Contra Costa County and designated each TAZ as either "EPC" or "non-EPC." Based on the CCTA Travel Demand Model's peak-period drive-alone travel times, the TAZs that could be reached within a 30-minute drive from each TAZ in the study area were identified and the jobs in those TAZs were summed. The average number of jobs per capita in each TAZ that is reachable within 30 minutes was calculated for EPC and non-EPC TAZs, and the results were compared. This RTO was not tracked in Action Plans that do not contain EPCs, including Tri-Valley and Lamorinda.

Equity RTO-4: EPC Job Access: Transit

Ensure that the number of jobs that can be reached by EPC residents with a 45-minute transit trip is equal to or greater than the number of jobs that can be reached with a 45-minute transit trip by all residents in the subregion.

The travel demand model's map of TAZs was compared to identified EPCs in Contra Costa County and designated each TAZ as either "EPC" or "non-EPC." Based on the CCTA Travel Demand Model's peak-period transit travel times, the TAZs that could be reached within a 45-minute transit journey from each TAZ in the study area were identified and the jobs in those TAZs were summed. The average number of jobs per capita in each TAZ that is reachable within 45 minutes was calculated for EPC and non-EPC TAZs, and the results were compared. This RTO was not tracked in Action Plans that do not contain EPCs, including Tri-Valley and Lamorinda.

Equity RTO-5: EPC Access to High Quality Transit

Ensure that the proportion of urbanized EPC land area in the subregion served by high-quality transit is equal to or greater than the urbanized land area served by high-quality transit in the subregion as a whole.

The methodology for this RTO is identical to Transit RTO-4, except that it applies specifically to EPC areas. This RTO assesses the percentage of urban land in EPC areas that has access to high quality transit by walking and bicycling. The project team used GIS to map the distribution of high frequency transit stops in the countywide EPC areas and identified the high quality transit zones, or areas within a ¼-mile radius from each of the stations. Additionally, the team mapped all rail and ferry stations in the EPC areas and identified areas within a ½-mile radius around each station. The project team summed

the high quality transit zone areas in EPC areas in acres and subtracted it from the total acreage of urban land in the EPC areas; the result was the percentage of urban land within walking or bicycling distance to high quality transit.

Climate Change RTOs

Climate Change RTO-1: SOV Mode Share

Reduce the mode share of single-occupant vehicles in the subregion.

The methodology for this RTO was identical to the methodology for the “Mode Share of Transit Trips” RTO, except that the metric associated with this RTO tracked a decrease in overall single-occupant vehicle (SOV) mode share, not an increase as desired for transit and active transportation mode share.

Climate Change RTO-2: Carpool Mode Share

Increase the mode share of carpooling in the subregion.

The methodology for this RTO is identical to the methodology for “SOV Mode Share,” RTO-1, except that the metric associated with this RTO tracked a decrease in vehicle mode share by carpool, not SOV mode share.

Climate Change RTO-3: Vehicle Miles Traveled

Reduce vehicle miles traveled per capita in the subregion.

VMT per capita was modeled for the 2019 Base Year and Baseline 2050 condition using outputs from the CCTA Countywide Travel Demand Model. Scripts tabulating VMT per capita at the residential location and VMT per employee at the worksite for each TAZ had already been developed as part of CCTA’s Technical Procedures update. Final processing was done in a spreadsheet, and results were tabulated by subregion.

Climate Change RTO-4: Greenhouse Gas Emissions

Reduce transportation greenhouse gas emissions per capita in the subregion.

This RTO was based on the VMT data developed, as described previously. VMT inputs were developed for the most recent Emission Factor (EMFAC) mobile source emissions model maintained by the California Air Resources Board. Subregional scenarios were created for the 2019 Base Year and 2050 Baseline conditions. Total tons of GHG emissions were divided by the subregional population assumed in the CCTA Countywide Travel Demand Model to arrive at average daily GHG emissions per capita.

Climate Change RTO-5: Zero-Emission Vehicles

Increase the share of zero-emission vehicles in the subregion The California Energy Commission tracks ZEV ownership in partnership with the Department of Motor Vehicles. Data are updated annually in April and are published on the Zero Emission Vehicle and Infrastructure Statistics web page. Vehicle population is also updated annually in April, to reflect the number of vehicles on the road during the previous calendar year. The vehicle population number includes vehicles whose registration is either current or less than 35 days expired.

Total registrations by vehicle type were available by county and zip code, and these data were applied to estimate the ZEV ownership by subregion.

Technology RTOs

Technology and Innovation RTO-1: Signal Interconnection Project

Complete the project to upgrade traffic signals to regional ethernet and/or fiber optic interconnection.

Interconnected signal systems communicate with other signals or systems. Signal interconnection helps to establish a connection between the traffic signals and the central system, which enables remote access to the signals from the local agency locations or the traffic management or operations center. This allows signal timings to be adjusted remotely during regular day-to-day operations, major incidents, and special events. Interconnection enables cross-jurisdiction communications, coordination, and data exchange in response to varying traffic conditions.

Information was collected from cities regarding signal systems to identify the percentage of signals that are currently interconnected through ethernet-based communications. The assembled data determined the level of signal interconnection as compared to the total number of signals with the jurisdiction and countywide as a whole.

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